MDS-JE320

SERVICE MANUAL

US Model
Canadian Model
AEP Model

Self Diagnostics Supported model

U.S. and foreign patents licensed from Dolby Laboratories Licensing Corporation.

Model Name Using Similar Mechanism	MDS-JE510
MD Mechanism Type	MDM-3GC
Optical Pick-up Type	KMS-260A/J1NP

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser (λ = 780 nm) Emission duration: continuous
Laser output	Less than 44.6 μW* * This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.
Laser diode properties	Material: GaAlAs
Revolutions (CLV)	400 rpm to 900 rpm
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Coding	Adaptive Transform Acoustic Coding (ATRAC)
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ±0.3 dB
Signal-to-noise ratio	Over 96 dB during playback
Wow and flutter	Below measurable limit

Inputs

	Jack type	Input impedance	Rated input	Minimum input
LINE (ANALOG) IN	Phono jacks	47 kilohms	500 mVrms	125 mVrms
DIGITAL OPTICAL IN	Square optical connector jack	Optical wave length: 660 nm	—	—

Outputs

	Jack type	Rated output	Load impedance
LINE (ANALOG) OUT	Phono jacks	2 Vrms (at 50 kilohms)	Over 10 kilohms

General

Power requirements

Where purchased	Power requirements
Continental Europe	220 – 230 V AC, 50/60 Hz
U.S.A and Canada	120 V AC, 60 Hz

Power consumption

Continental Europe: 20 W
U.S.A and Canada: 19 W

Dimensions (approx.) (w/h/d) incl. projecting parts

430 × 95 × 280.5 mm ($17 \times 3^{3}/_{4} \times 11^{1}/_{8}$ in.)

Mass (approx.) 3.5 kg (7 lbs 11 oz)

Supplied accessories

- Audio connecting cords (2)
- Optical cable (1)

Design and specifications are subject to change without notice.

MINIDISC DECK

SONY®

MICROFILM

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the equipment manufacturer.
Discard used batteries according to manufacture's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Eksplosjonsfare ved feilakting skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier katterier kasseres i henhold til fabrikantens

VARNIG

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreakrifter.

VAROITUS

Parist voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSAETTELSE FOR STRÅLING.
VORSICHT : UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET UND SICHEREITSVERRIEGELUNG ÜBERBRÜCKT. NICHT DEM STRAHL AUSSETZEN.
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING : OSYNLING LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVERSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VIGYAZAT! : A BURKOLAT NYITÁSAKOR LÁTHATATLAN LÉZERSUGÁRVESZÉLY! KERÜLJE A BESUGÁRZÁST!

This caution label is located inside the unit.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Flexible Circuit Board Repairing

- Keep the temperature of soldering iron around 270˚C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE

The AC leakage from any exposed metal part to earth Ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

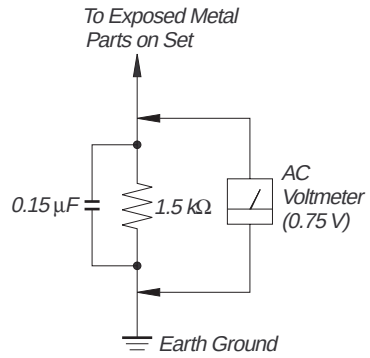
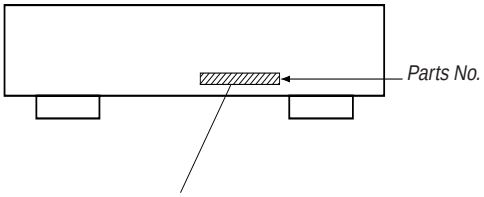


Fig. A. Using an AC voltmeter to check AC leakage.

MODEL IDENTIFICATION — BACK PANEL —



Parts No.	Model
4-990-651-1 ☐	US model
4-990-651-4 ☐	Canadian model
4-990-651-5 ☐	AEP model

TABLE OF CONTENTS

1. SERVICING NOTE 5

2. GENERAL 8

3. DISASSEMBLY
- 3-1. Case and Front Panel Assembly 9
- 3-2. Bracket (T), (L) and (R) 9
- 3-3. BD Board 10
- 3-4. SUB Chassis 10
- 3-5. Shutter Assembly 11
- 3-6. Over Write Head 11
- 3-7. Slider Complete Assembly 12

4. TEST MODE 13

5. ELECTRICAL ADJUSTMENTS 16

6. DIAGRAMS
- 6-1. Brock Diagrams
  - • BD Section 21
  - • Main Section 23
- 6-2. Circuit Boards Location 25
- 6-3. Printed Wiring Board — BD Section — 27
- 6-4. Schematic Diagram — BD Section (1/2) — 29
- 6-5. Schematic Diagram — BD Section (2/2) — 31
- 6-6. Printed Wiring Board — Main Section — 33
- 6-7. Schematic Diagram — Main Section (1/3) — 35
- 6-8. Schematic Diagram — Main Section (2/3) — 37
- 6-9. Schematic Diagram — Main Section (3/3) — 39
- 6-10. Printed Wiring Board — Display Section — 41
- 6-11. Schematic Diagram — Display Section — 43
- 6-12. Printed Wiring Board — Switch Section — 45
- 6-13. Schematic Diagram — Switch Section — 47
- 6-14. IC Brock Diagrams — BD Section— 49
- 6-15. IC Pin Functions 54

7. EXPLODED VIEWS
- 7-1. Main Section 63
- 7-2. Front Panel Section 64
- 7-3. Mechanism Deck Section (1) (MDM-3GC) 65
- 7-4. Mechanism Deck Section (2) (MDM-3GC) 66

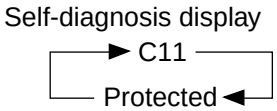
8. ELECTRICAL PARTS LIST 67

[SELF-DIAGNOSIS FUNCTION]

The self-diagnosis function consists of error codes for users which are displayed automatically when errors occur, and error codes which show the error history in the test mode during servicing.For detail on how to view error codes for users, refer to the following box in the instruction manual.

Self-Diagnosis Function

The deck has a self-diagnosis display. This function shows a three-digit display (a combination of a letter and figures) and the corresponding message alternately, so you can check the deck's condition. If such a display appears, check the following table in order to resolve the problem. Should any problem persist, consult your nearest Sony dealer.



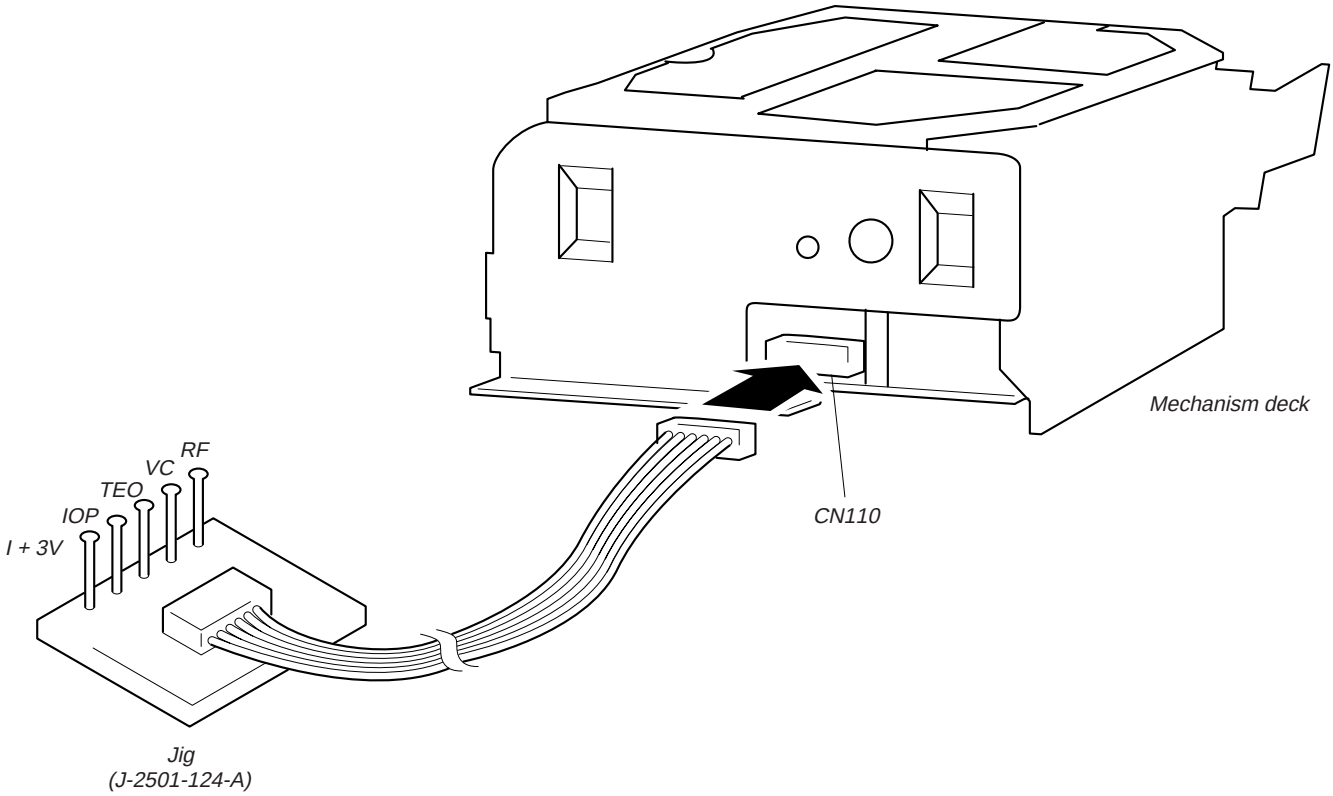
Three-digit display/Message	Cause/Remedy
C11/Protected	The inserted MD is record-protected. ➡Take out the MD, and close the record-protect tab (page 9.)
C13/REC Error	The recording was not made properly. ➡Set the deck in a stable place, and repeat the recording procedure.
	The inserted MD is dirty (with smudges, fingerprints, etc.) scratched, or not up to standards. ➡Replace the disc, and repeat the recording procedure.
C13/Disc Error	The deck could not read the TOC of the MD properly. ➡Take out the MD, and insert it again.
C14/Disc Error	The deck could not read the TOC of the MD properly. ➡Insert another disc. ➡If possible, erase all tracks on the MD using the All Erase Function on page 28.
C71/Din Unlock	A moment's lighting is due to the signals of the digital program being recorded. This does not affect the recorded material.
	While recording from a digital component connected through the digital input connector, the digital connecting cable was unplugged or the digital component turned off. ➡Connect the cable or turn the digital component back on.

SECTION 1
SERVICING NOTE

JIG FOR CHECKING BD BOARD WAVEFORM

The special jig (J-2501-124-A) is useful for checking the waveform of the BD board. The names of terminals and the checking items to be performed are shown as follows.

I+3V : For measuring IOP (Check the deterioration of the optical pick-up laser)
IOP : For measuring IOP (Check the deterioration of the optical pick-up laser)
TEO : TRK error signal (Traverse adjustment)
VC : Reference level for checking the signal
RF : RF signal (Check jitter)

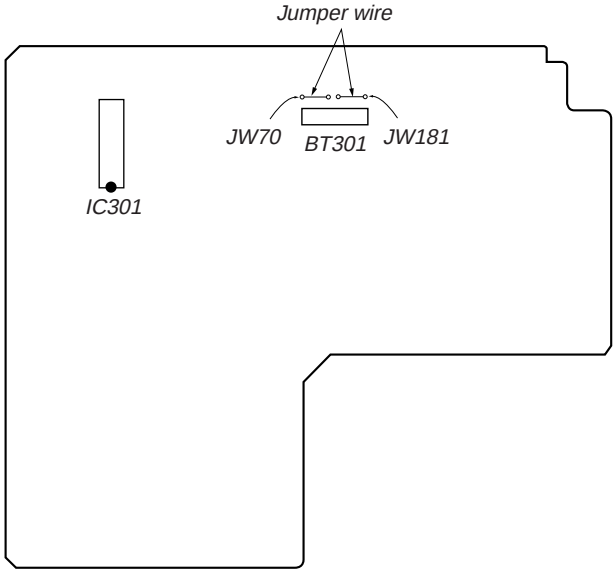


FORCED RESET

The system microprocessor can be reset in the following way.
Use these methods when the unit cannot be operated normally due to the overrunning of the microprocessor, etc.

Method :
Disconnect the power plug, short-circuit jumper wire of JW70 and JW181.

[MAIN BOARD] (Component Side)



RETRY CAUSE DISPLAY MODE

- In this test mode, the causes for retry of the unit during recording can be displayed on the fluorescent display tube. This is useful for locating the faulty part of the unit.
- The data amount stored in DRAM, number of retries, and retry cause are displayed. Each is displayed in hexadecimal number.
- The display of the DRAM data amount enables data reading, accumulation, ejection, and writing to be performed smoothly. If writing is not smooth, data may decrease considerably.

Method:

1. Load a recordable disc whose contents can be erased into the unit.
2. Press the EDIT/NO button several times to display “All Erase?” on the fluorescent display tube.
3. Press the YES button.
4. When “All Erase??” is displayed on the fluorescent display tube, the numbers on the music calendar will start blinking.
5. Press the YES button to display “Complete”, and press the ■ button immediately and continue pressing for about 10 seconds.
6. When the “TOC” displayed on the fluorescent display tube goes off, release the ■ button.
7. Press the ● REC and ▷ PLAY buttons to start recording.
8. Press the DISPLAY/CHAR button to display the test mode (Fig. 1), and check the display.
9. The Rt value increases with each retry. If an error occurs after a retry, “Retry Error” will be displayed, and the number of retries counted will be set back to 0.
10. To exit the test mode, press the I/⏻ button. Turn OFF the power, and after “TOC” disappears, disconnect the power plug from the outlet.

Fig. 1 Reading the Test Mode Display

Fluorescent Display Tube Signs

SC @@ Rt # # ＊＊

@@ : Displays the DRAM memory amount when at all times.
# # : Displays the number of retries. When a retry error occurs, the number will be set back to 0.
＊＊ : Cause of retry

All three displays above are in hexadecimal numbers.

Reading the Retry Cause Display

	Higher Bits				Lower Bits				Hexa-decimal	Cause of Retry	Occurring conditions
Hexadecimal	8	4	2	1	8	4	2	1			
Bit	b7	b6	b5	b4	b3	b2	b1	b0			
Binary	0	0	0	0	0	0	0	0	00	Spindle is slow	When spindle rotation is detected as slow
	0	0	0	0	0	0	0	1	01	(Not used)	(Not used)
	0	0	0	0	0	0	1	0	02	ader5	When ADER was counted more than five times continuously
	0	0	0	0	0	1	0	0	04	Discontinuous address	When ADIP address is not continuous
	0	0	0	0	1	0	0	0	08	(Not used)	(Not used)
	0	0	0	1	0	0	0	0	10	FCS incorrect	When not in focus
	0	0	1	0	0	0	0	0	20	IVR rec error	When ABCD signal level exceeds the specified range
	0	1	0	0	0	0	0	0	40	CLV unlock	When CLV is unlocked
	1	0	0	0	0	0	0	0	80	Access fault	When access operation is not performed normally

Reading the Display:
Convert the hexadecimal display into binary display. If more than two causes, they will be added.

Example
When 42 is displayed:
Higher bit : 4 = 0100 ⟶ b6
Lower bit : 2 = 0010 ⟶ b1
In this case, the retry cause is combined of “CLV unlock” and “ader5”.

When A2 is displayed:
Higher bit : A = 1010 ⟶ b7+b5
Lower bit : 2 = 0010 ⟶ b1

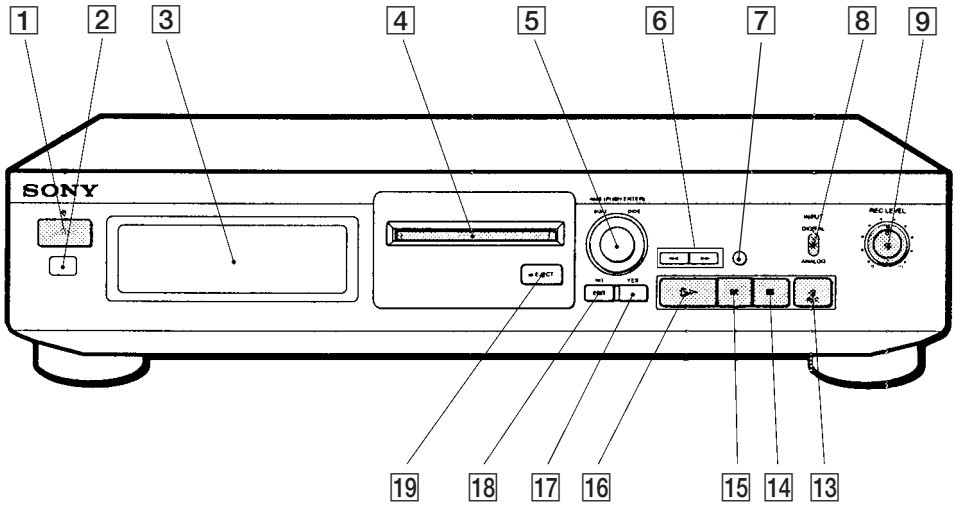
The retry cause in this case is combined of “access fault”, “IVR rec error”, and “ader5”.

Hexadecimal ⟶ Binary Conversion Table

Hexadecimal	Binary	Hexadecimal	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

SECTION 2
GENERAL

Location of Parts and Controls

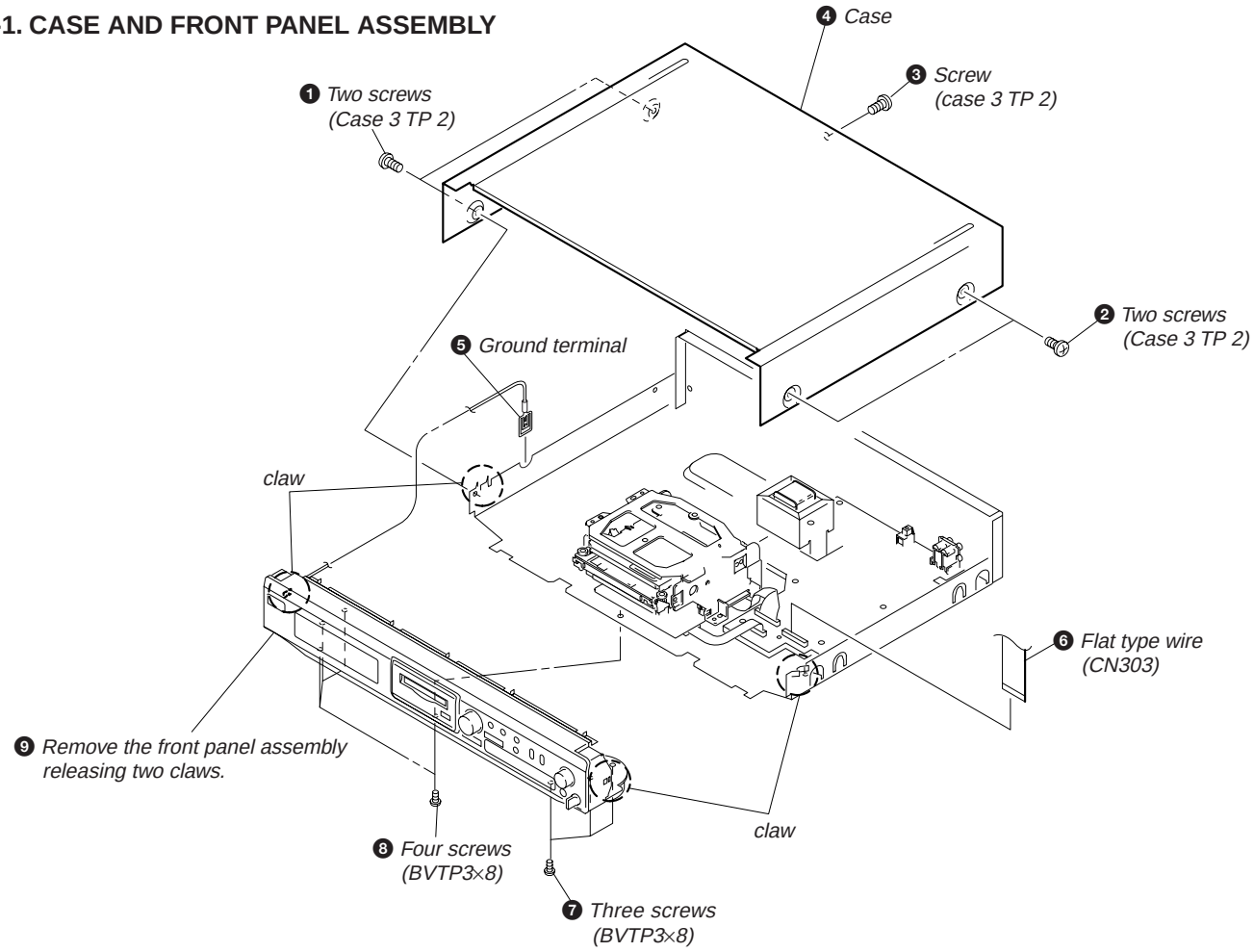


1 I/⏻ (Power) switch
2 Remote sensor
3 Display window
4 Disc compartment
5 AMS knob
6 ◀◀/▶▶ buttons
7 DISPLAY/CHAR button
8 INPUT switch
9 REC LEVEL knob
13 ● REC (recording) button
14 ■ (stop) button
15 ❚❚ (pause) button
16 ▷ (play) button
17 YES button
18 EDIT/NO button
19 ⏏ EJECT button

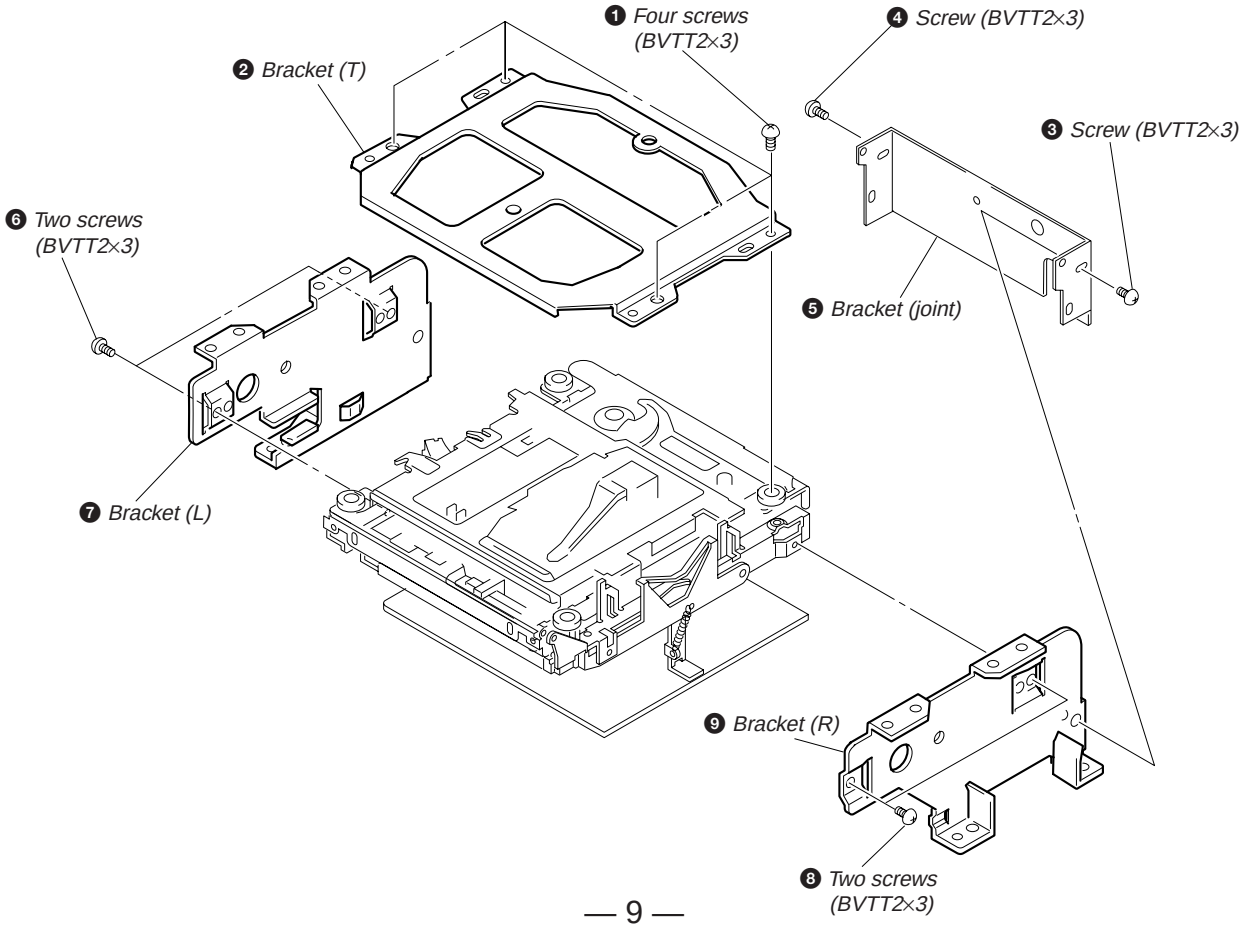
SECTION 3
DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

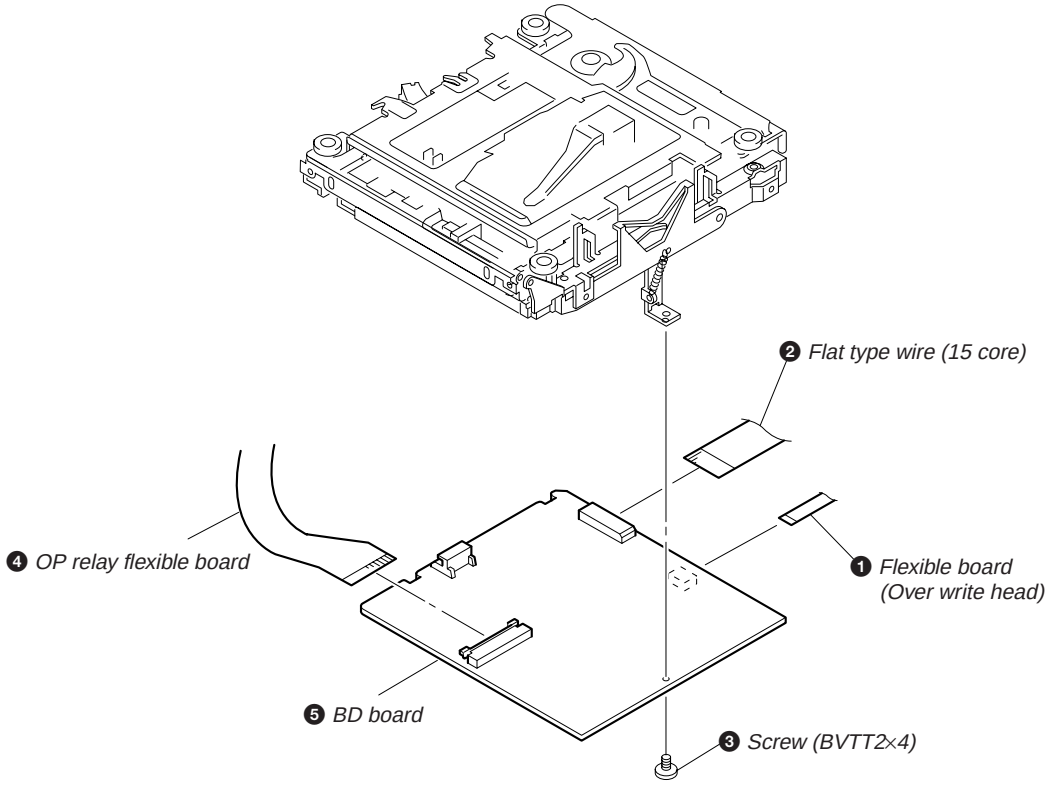
3-1. CASE AND FRONT PANEL ASSEMBLY


❹ Case
❸ Screw (case 3 TP 2)
❶ Two screws (Case 3 TP 2)
❷ Two screws (Case 3 TP 2)
❺ Ground terminal
claw
❻ Flat type wire (CN303)
❾ Remove the front panel assembly releasing two claws.
claw
❽ Four screws (BVTP3×8)
❼ Three screws (BVTP3×8)

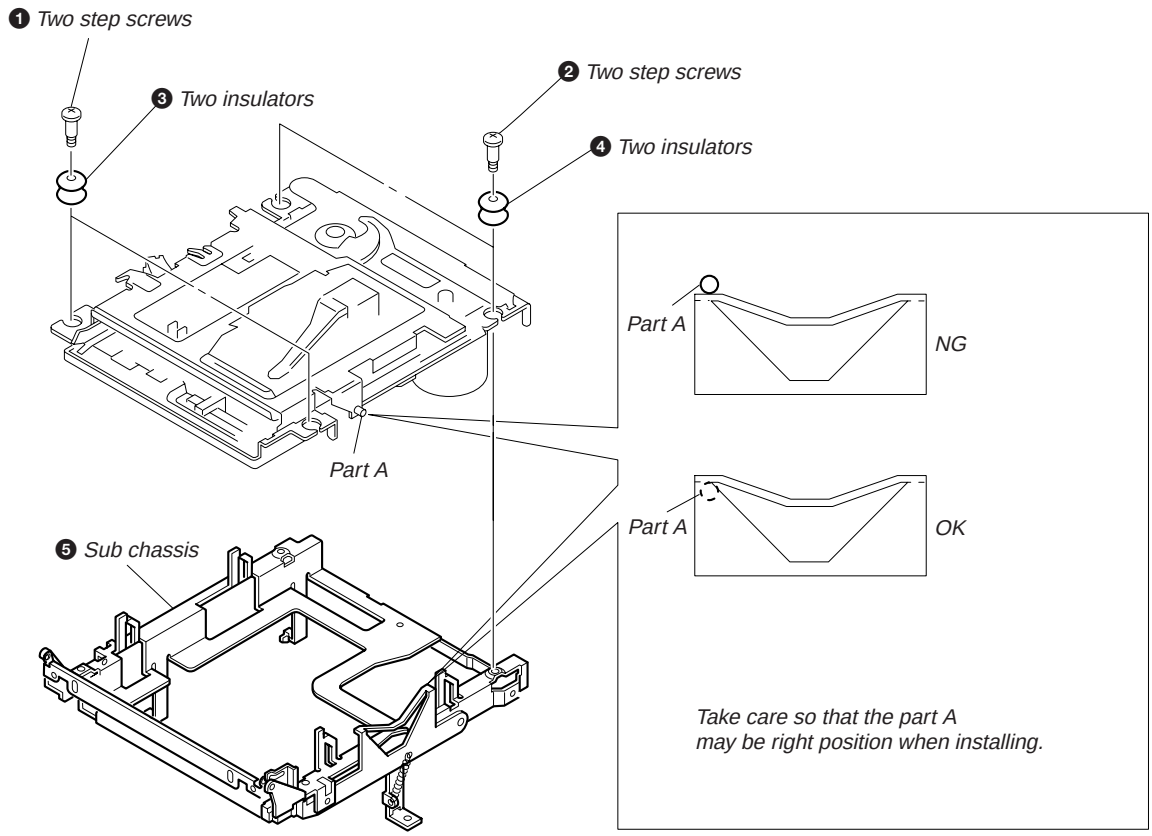
3-2. BRACKET (T), (L) AND (R)



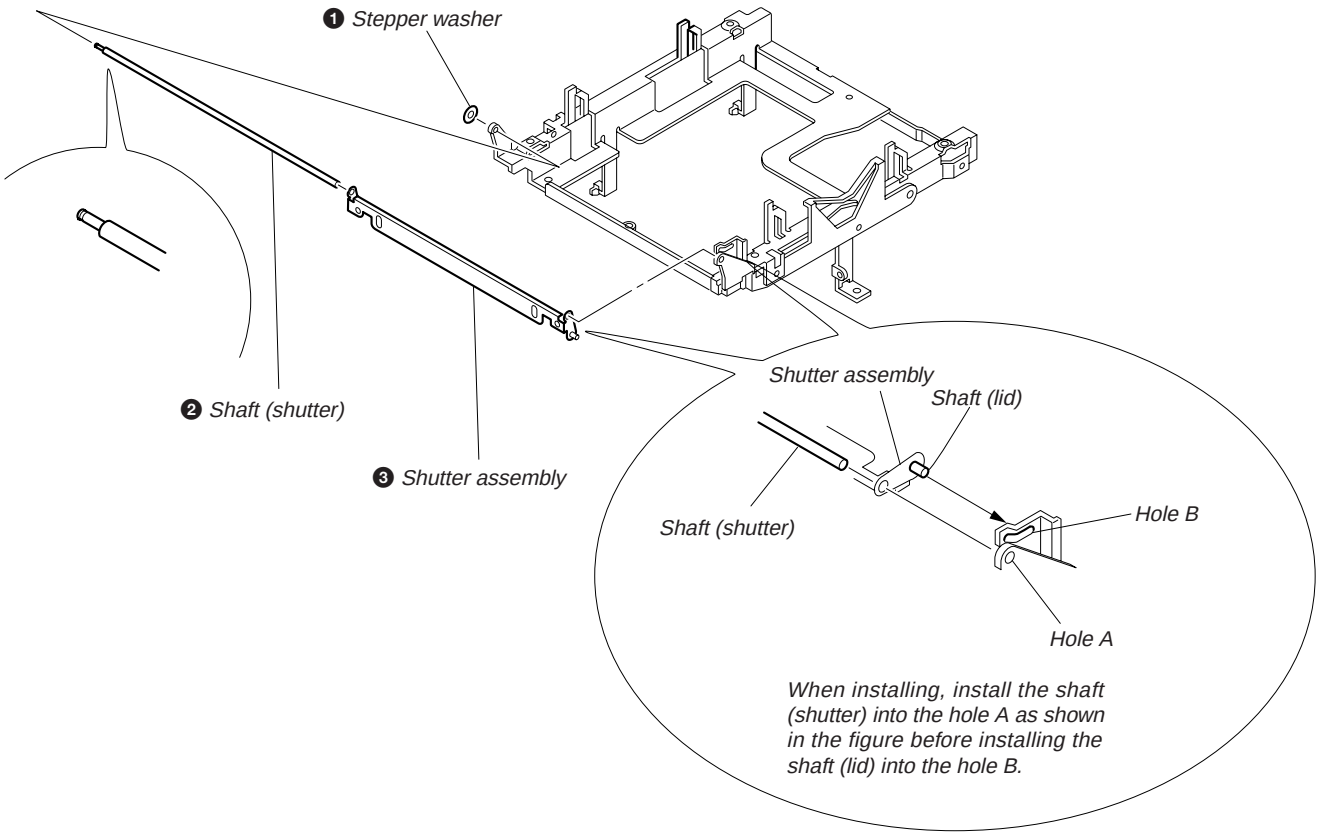
3-3. BD BOARD



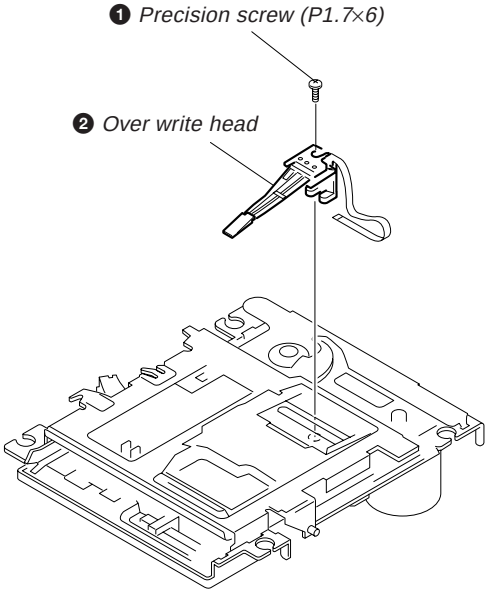
3-4. SUB CHASSIS



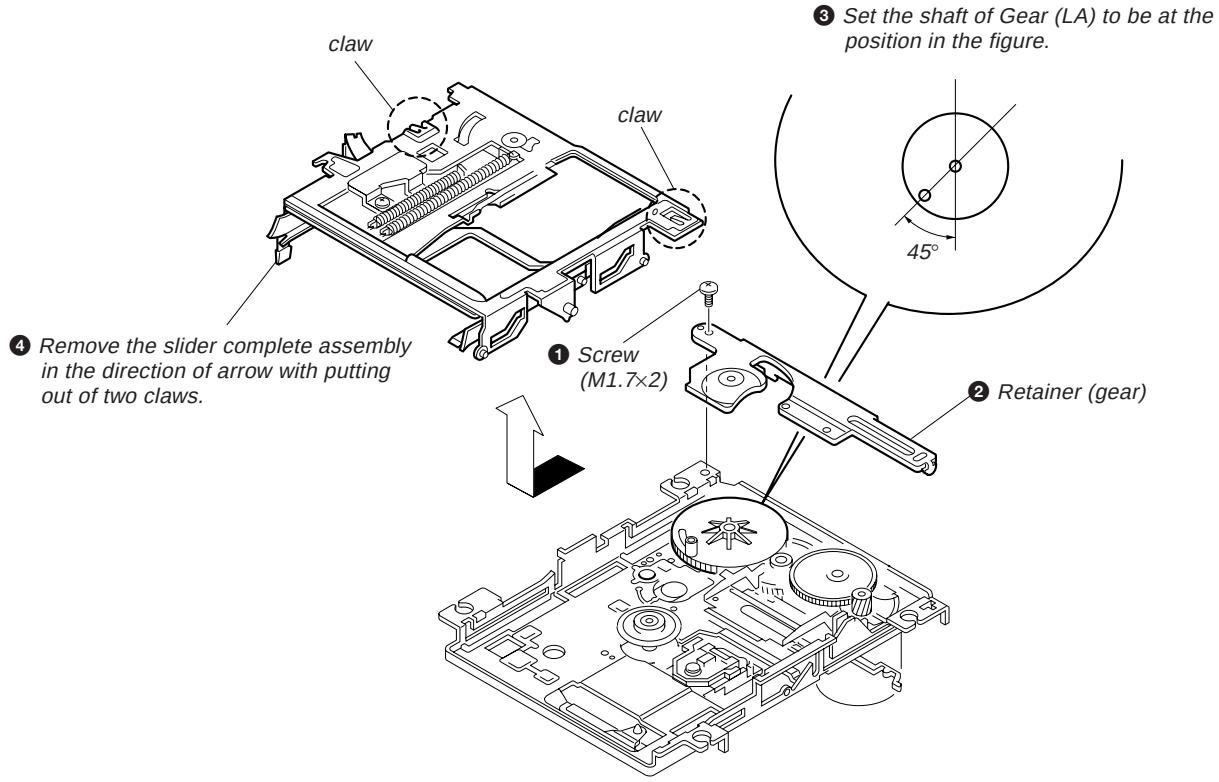
3-5. SHUTTER ASSEMBLY


❶ Stepper washer
❷ Shaft (shutter)
❸ Shutter assembly
Shutter assembly
Shaft (lid)
Shaft (shutter)
Hole B
Hole A
When installing, install the shaft (shutter) into the hole A as shown in the figure before installing the shaft (lid) into the hole B.

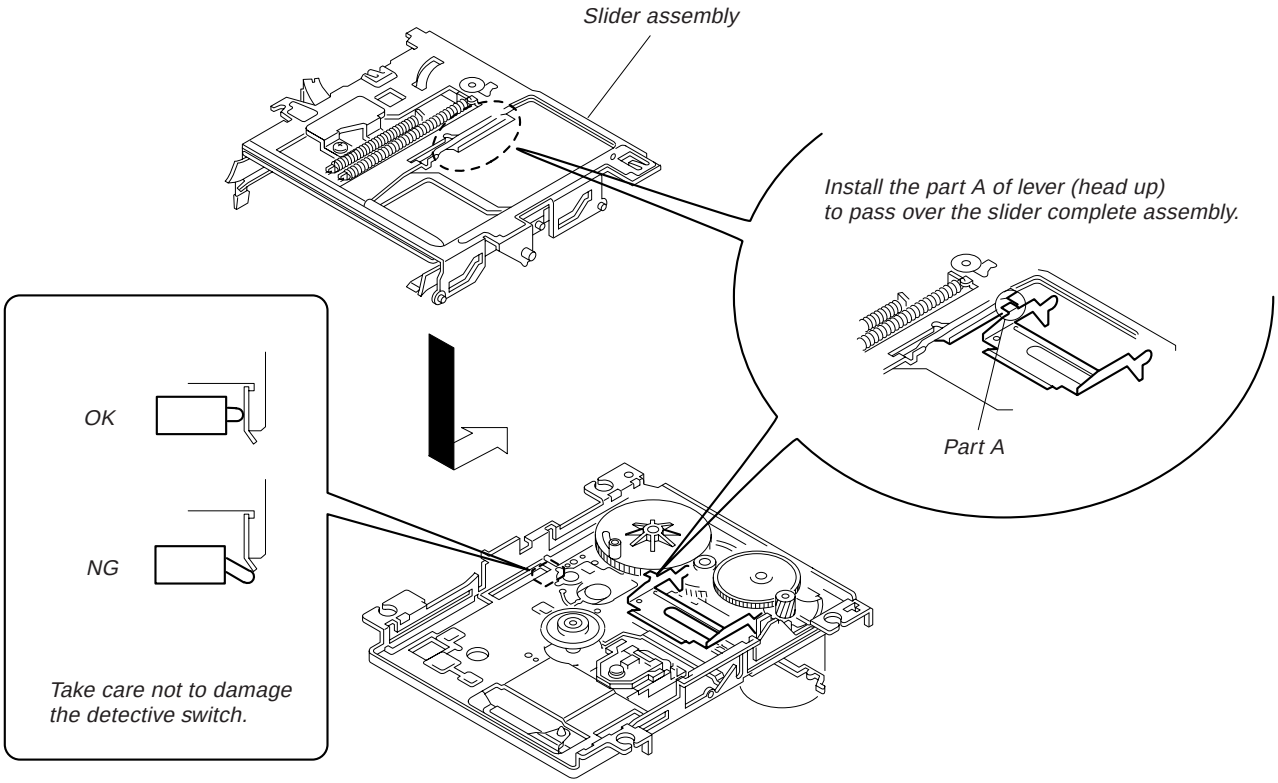
3-6. OVER WRITE HEAD



3-7. SLIDER COMPLETE ASSEMBLY


❸ Set the shaft of Gear (LA) to be at the position in the figure.
claw
claw
45°
❹ Remove the slider complete assembly in the direction of arrow with putting out of two claws.
❶ Screw (M1.7×2)
❷ Retainer (gear)

• **Note for Installation of Slider Complete Assembly**


Slider assembly
Install the part A of lever (head up) to pass over the slider complete assembly.
Part A
OK
NG
Take care not to damage the detective switch.

SECTION 4
TEST MODE

4-1. PRECAUTIONS FOR USE OF TEST MODE

① As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.
Even if the ⏏EJECT button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.
Therefore, it will be ejected while rotating.
Be sure to press the ⏏EJECT button after pressing the EDIT/NO button and the rotation of disc is stopped.

② The erasing-protection tab is not detected in the test mode. Therefore, operating in the recording laser emission mode and pressing the ●REC button, the recorded contents will be erased regardless of the position of the tab. When using a disc that is not to be erased in the test mode, be careful not to enter the continuous recording mode and traverse adjustment mode.

4-1-1. Recording laser emission mode and operating buttons

1. Continuous recording mode (CREC MODE)
2. Traverse adjustment mode (EFBAL ADJUST)
3. Laser power adjustment mode (LDPWR ADJUST)
4. Laser power check mode (LDPWR CHECK)
5. When pressing the ●REC button.

4-2. SETTING THE TEST MODE

While pressing the AMS knob, insert the power plug into the power supply outlet, and release the AMS knob.

4-3. EXITING THE TEST MODE

When the I/⏻ button is pressed, it becomes in the STANDBY mode. Or unplug the power plug from an outlet.

4-4. BASIC OPERATIONS OF THE TEST MODE

All operations are performed using the AMS knob, YES button, and EDIT/NO button.
The functions of these buttons are as follows.

Function name	Function
AMS knob	Changes parameters and modes
YES button	Proceeds onto the next step. Finalizes input.
EDIT/NO button	Returns to previous step. Stops operations.

4-5. SELECTING THE TEST MODE

Thirteen test modes are selected by turning the AMS knob.

Display	Contents
TEMP ADJUST	Temperature compensation offset adjustment
LDPWR ADJUST	Laser power adjustment
LDPWR CHECK	Laser power check
EFBAL ADJUST	Traverse adjustment
FBIAS ADJUST	Focus bias adjustment
FBIAS CHECK	Focus bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous recording mode
DETRK CHECK	Detrack check
S curve CHECK	S curve check *
EEP MODE	Non-volatile memory mode *
MANUAL CMD	Manual command transfer mode *
SVDATA READ	Data reading out mode *

For detailed description of each adjustment mode, refer to “5. Electrical Adjustments”.
If a different adjustment mode has been selected by mistake, press the EDIT/NO button to exit from this mode.

* The EEP MODE, S curve CHECK, MANUAL CMD and SVDATA READ are not used in servicing. If set accidentally, press the EDIT/NO button immediately to exit this mode.

4-5-1. Operating the Continuous Playback Mode

1. Entering the continuous playback mode
   ① Set the disc in the unit. (Whichever recordable discs or discs for playback only are available.)
   ② Rotate the AMS knob and display “CPLAY MODE”.
   ③ Press the YES button to change the display to “CPLAY MID”.
   ④ When access completes, the display changes to “C1 = □□□□□ AD = □□”.
   Note : The numbers “□” displayed show you error rates and ADER.
2. Changing the parts to be played back
   ① Press the YES button during continuous playback to change the display as below.
   “CPLAY MID” → “CPLAY OUT”→ “CPLAY IN”
   When pressed another time, the parts to be played back can be moved.
   ② When access completes, the display changes to “C1 = □□□□□ AD = □□”.
   Note : The numbers “□” displayed show you error rates and ADER.
3. Ending the continuous playback mode
   ① Press the EDIT/NO button. The display will change to “CPLAY MODE”.
   ② Press the ⏏EJECT button to remove the disc.
   Note : The playback start addresses for IN, MID, and OUT are as follows. In case you want to display the address of the playback position on the display, press the DISPLAY/CHAR button and display “CPLAY (□□□□□)”.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster

4-5-2. Operating the Continuous Recording Mode

1. Entering the continuous recording mode
   ① Set a recordable disc in the unit. (Refer to Note 3)
   ② Rotate the AMS knob and display “CREC MODE”.
   ③ Press the YES button to change the display to “CREC MID”.
   ④ When access completes, the display changes to “CREC (□□□□□)” and **REC** lights up.
   Note : The numbers “□” displayed shows you the recording position addresses.
2. Changing the parts to be recorded
   ① When the YES button is pressed during continuous recording, the display changes as below.
   “CPLAY MID” → “CPLAY OUT”→ “CPLAY IN”
   When pressed another time, the parts to be recorded can be changed. **REC** goes off.
   ② When access completes, the display changes to “CREC (□□□□□)” and **REC** lights up.
   Note : The numbers “□” displayed shows you the recording position addresses.
3. Ending the continuous recording mode
   ① Press the EDIT/NO button. The display changes to “CREC MODE” and **REC** goes off.
   ② Press the ⏏EJECT button to remove the disc.
   Note 1 : The recording start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster
   Note 2 : The EDIT/NO button can be used to stop recording anytime.
   Note 3 : During the test mode, the erasing-protection tab will not be detected. Therefore be careful not to set the continuous recording mode when a disc not to be erased is set in the unit.
   Note 4 : Do not perform continuous recording for long periods of time above 5 minutes.
   Note 5 : During continuous recording, be careful not to apply vibration.

4-5-3. Non-Volatile Memory Mode

This mode reads and writes the contents of the non-volatile memory.
It is not used in servicing. If set accidentally, press the EDIT/NO button immediately to exit it.

4-6. FUNCTIONS OF OTHER BUTTONS

Function	Contents
▷	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶	The sled moves to the outer circumference only when this is pressed.
◀◀	The sled moves to the inner circumference only when this is pressed.
● REC	Turns recording ON/OFF when pressed during continuous playback.
DISPLAY/ CHAR	Switches the display when pressed.Returns to previous step. Stops operations.

Note : The erasing-protection tab is not detected during the test mode. Recording will start regardless of the position of the erasing-protection tab when the ● REC button is pressed.

4-7. TEST MODE DISPLAYS

Each time the DISPLAY/CHAR button is pressed, the display changes in the following order.
MODE display→Error rate display→Address display→Auto gain display→IVR display
The auto gain display and the IVR display are not used for servicing.

1. MODE display
   Displays “TEMP ADJUST”, “CPLAY MODE”, etc.
2. Error rate display
   Error rates are displayed as follows.
   C1 = □□□□ AD = □□□□
   C1 = : Indicates C1 error
   AD = : Indicates ADER
3. Address display
   Addresses are displayed as follows. (MO : Recordable disc, CD : Disc for playback only)
   h = □□□□ s = □□□□ (MO pit and CD)
   h = □□□□ a = □□□□ (MO groove)
   h = : Header address
   s = : SUBQ address
   a = : ADIP address
   * “_” is displayed when the address cannot be read.
4. Auto gain display
   Auto gains are displayed as follows.
   AG F = □□ T = □□
   F= Focus auto gain collection value.
   T= Tracking auto gain collection value.

4-8. MEANINGS OF OTHER DISPLAYS

Display	Contents		
	Light	Off	Blinking
▶	During continuous playback	STOP	
▮▮	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Pit	Groove	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A. SPACE	ABCD adjustment completed		
A – B	[Focus auto gain successful / Tracking auto gain successful]		[Focus auto gain successful / Tracking auto gain failed]

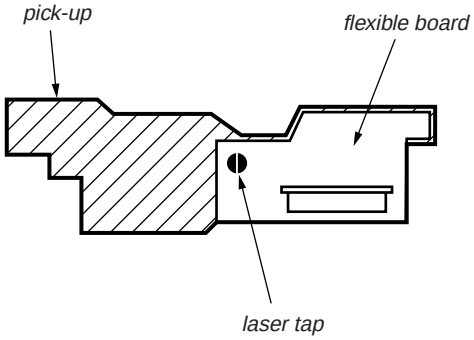
SECTION 5
ELECTRICAL ADJUSTMENTS

5-1. PRECAUTIONS FOR CHECKING LASER DIODE EMISSINON

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

5-2. PRECAUTIONS FOR USE OF OPTICAL PICK-UP (KMS-260A)

As the laser diode in the optical pick-up is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



Optical pick-up flexible board

	Optical Pick-up	BD Board		
		IC171	D101	IC101, IC121, IC192
1.Temperature compensation offset adjustment	×	O	O	O
2. Laser power adjustment	O	O	×	O
3. Traverse adjustment	O	O	×	O
4. Focus bias adjustment	O	O	×	O
5. Error rate check	O	O	×	O

5-3. PRECAUTIONS FOR ADJUSTMENTS

1) When replacing the following parts, perform the adjustments and checks with O in the order shown in the following table.
2) Set the test mode when performing adjustments.
   After completing the adjustments, exit the test mode.
3) Perform the adjustments in the order shown.
4) Use the following tools and measuring devices.
   - Check Disc (MD) TDYS-1
     (Parts No. 4-963-646-01)
   - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
   - Oscilloscope (Measure after performing CAL of prove.)
   - Digital voltmeter
   - Thermometer
   - Jig for checking BD board waveform
     (Parts No. : J-2501-124-A)
5) When observing several signals on the oscilloscope, etc., make sure that VC and ground do not connect inside the oscilloscope.
   (VC and ground will become short-circuited.)
6) Using the above jig enables the waveform to be checked without the need to solder.
   (Refer to Servicing Note on page 4.)

Note : When performing laser power checks and adjustment (electrical adjustment), use of the new MD laser power meter 8010S (J-2501-145-A) instead of the conventional laser power meter is convenient.
It sharply reduces the time and trouble to set the laser power meter sensor onto the objective lens of the pick-up.

5-4. CREATING CONTINUOUSLY RECORDED DISC

- This disc is used in focus bias adjustment and error rate check.
  The following describes how to create a continuous recording disc.

1. Insert a disc (blank disc) commercially available.
2. Rotate the AMS knob and display “CREC MODE”.
3. Press the YES button again to display “CREC MID”.
   Display “CREC (0300)” and start to recording.
4. Complete recording within 5 minutes.
5. Press the EDIT/NO button and stop recording .
6. Press the ⏏EJECT button and remove the disc.

The above has been how to create a continuous recorded data for the focus bias adjustment and error rate check.

Note :

- Be careful not to apply vibration during continuous recording.

5-5. TEMPERATURE COMPENSATION OFFSET ADJUTMENT

Save the temperature data at that time in the non-volatile memory as 25 ˚C reference data.

Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 ˚C to 28 ˚C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature of 22 ˚C to 28 ˚C.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

Adjusting Method :

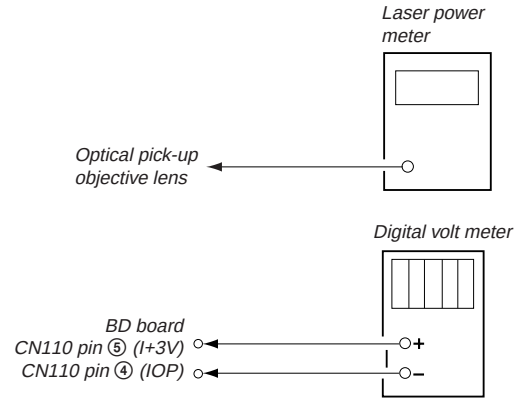
1. Rotate the AMS knob and display “TEMP ADJUST”.
2. Press the YES button and select the “TEMP ADJUST” mode.
3. “TEMP = □□” and the current temperature data will be displayed.
4. To save the data, press the YES button.
   When not saving the data, press the EDIT/NO button.
5. When the YES button is pressed, “TEMP = □□ SAVE” will be displayed and turned back to “TEMP ADJUST” display then. When the EDIT/NO button is pressed, “TEMP ADJUST” will be displayed immediatelly.

Specified Value :

The “TEMP = □□” should be within “E0 - EF”, “F0 - FF”, “00 - 0F”, “10 - 1F” and “20 - 2F”.

5-6. LASER POWER ADJUSTMENT

Connection :



Adjusting Method :

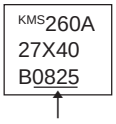
1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the ◀◀ button or ▶▶ button to move the optical pick-up.)
   Connect the digital volt meter to CN110 pin ⑤ (I+3V) and CN110 pin ④ (IOP).
2. Rotate the AMS knob and display “LDPWR ADJUST”.
   (Laser power : For adjustment)
3. Press the YES button once and display “LD 0.9 mW $ □□”.
4. Rotate the AMS knob so that the reading of the laser power meter becomes 0.86 to 0.92 mW. Press the YES button after setting the range knob of the laser power meter, and save the adjustment results. (“LD SAVE $ □□” will be displayed for a moment.)
5. Then “LD 7.0 mW $ □□” will be displayed.
6. Rotate the AMS knob so that the reading of the laser power meter becomes 6.9 to 7.1 mW, press the YES button and save it.

Note : Do not perform the emission with 7.0 mW more than 15 seconds continuously.

7. Then, rotate the AMS knob and display “LDPWR CHECK”.
8. Press the YES button once and display “LD 0.9 mW $ □□”. Check that the reading of the laser power meter become 0.85 to 0.91 mW.
9. Press the YES button once more and display “LD 7.0 mW $ □□”. Check that the reading the laser power meter and digital volt meter satisfy the specified value.

Specified Value :

Laser power meter reading : 7.0 ± 0.1 mW
Digital voltmeter reading : Optical pick-up displayed value ± 10%



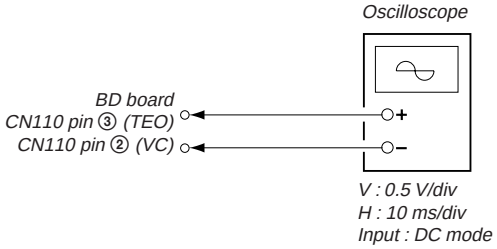
Iop = 82.5 mA in this case
Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

(Optical pick-up label)

10. Press the EDIT/NO button and display “LDPWR CHECK” and stop the laser emission.
    (The EDIT/NO button is effective at all times to stop the laser emission.)

5-7. TRAVERSE ADJUSTMENT

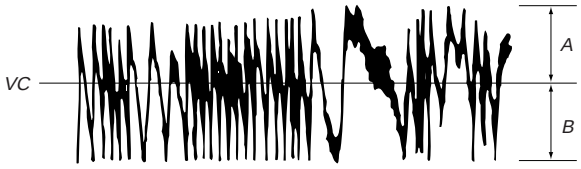
Connection :



Adjusting method :

1. Connect an oscilloscope to CN110 pin ③ (TEO) and CN110 pin ② (VC) of the BD board.
2. Load a disc (any available on the market). (Refer to Note 1.)
3. Press the ◀◀ button or ▶▶ button and move the optical pick-up outside the pit.
4. Rotate the AMS knob and display "EFBAL ADJUST".
5. Press the YES button and display "EFB = ▯▯ MO-R".
   (Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value.
   (When the AMS knob is rotated, the ▯▯ of "EFB= ▯▯" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.
   (Read power traverse adjustment)

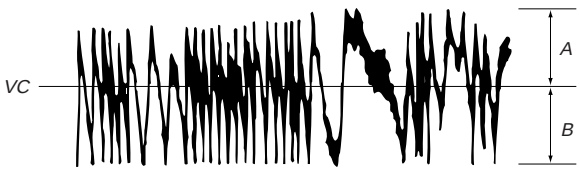
   (Traverse Waveform)



Specification A = B

7. Press the YES button and save the result of adjustment to the non-volatile memory ("EFB = ▯▯ SAVE" will be displayed for a moment. Then "EFB = ▯▯ MO-W" will be displayed).
8. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value.
   (When the AMS knob is rotated, the ▯▯ of "EFB- ▯▯" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.
   (Write power traverse adjustment)

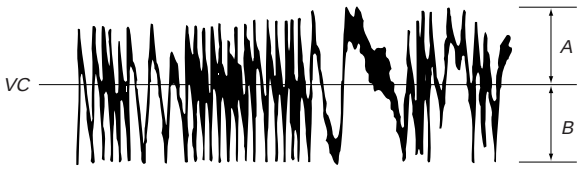
   (Traverse Waveform)



Specification A = B

9. Press the YES button, and save the adjustment results in the non-volatile memory. ("EFB = ▯▯ SAVE" will be displayed for a moment.)
10. "EFB = ▯▯ MO-P". will be displayed.
    The optical pick-up moves to the pit area automatically and servo is imposed.
11. Rotate the AMS knob until the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

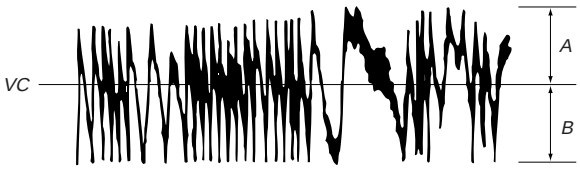
    (Traverse Waveform)



Specification A = B

12. Press the YES button, and save the adjustment results in the non-volatile memory. ("EFB = ▯▯ SAVE" will be displayed for a moment.)
    Next "EFBAL CD" is displayed. The disc stops rotating automatically.
13. Press the ⏏EJECT button and remove the disc.
14. Load the check disc (MD) TDYS-1.
15. Press the YES button and display "EFB = ▯▯ CD". Servo is imposed automatically.
16. Rotate the AMS knob so that the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

    (Traverse Waveform)

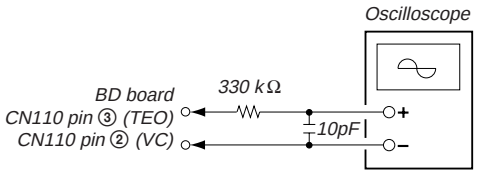


Specification A = B

17. Press the YES button, display "EFB = ▯▯ SAVE" for a moment and save the adjustment results in the non-volatile memory.
    Next "EFBAL ADJUST" will be displayed.
18. Press the ⏏EJECT button and remove the check disc (MD) TDYS-1.

Note 1 : MO reading data will be erased during if a recorded disc is used in this adjustment.

Note 2 : If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



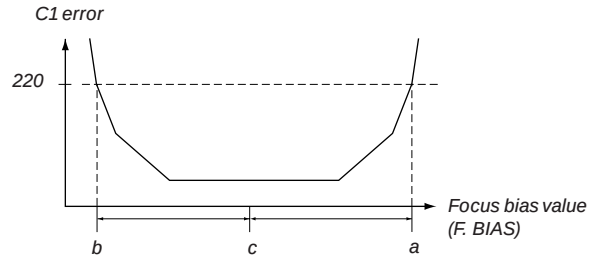
5-8. FOCUS BIAS ADJUSTMENT

Adjusting Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button and display "CPLAY MID".
4. Press the EDIT/NO button when "C1 = □□□□ AD = □□" is displayed.
5. Rotate the AMS knob and display "FBIAS ADJUST".
6. Press the YES button and display " □□□□/□□ a = □□".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the AMS knob in the clockwise direction and find the focus bias value at which the C1 error rate becomes 220 (Refer to Note 2).
8. Press the YES button and display " □□□□/□□ b = □□".
9. Rotate the AMS knob in the counterclockwise direction and find the focus bias value at which the C1 error rate becomes 220.
10. Press the YES button and display " □□□□/□□ c = □□".
11. Check that the C1 error rate is below 50 and ADER is 00. Then press the YES button.
12. If the "(□□)" in "□□ - □□ - □□ (□□)" is above 20, press the YES button.
    If below 20, press the EDIT/NO button and repeat the adjustment from step 2.
13. Press the ⏏EJECT button to remove the continuously recorded disc.

Note 1 : The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

Note 2 : As the C1 error rate changes, perform the adjustment using the average vale.



5-9. ERROR RATE CHECK

5-9-1. CD Error Rate Check

Checking Method :

1. Load a check disc (MD) TDYS-1.
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. The display changes to "C1 = □□□□ AD = □□".
5. Check that the C1 error rate is below 20.
6. Press the EDIT/NO button, stop playback, press the ⏏EJECT button, and remove the test disc.

5-9-2. MO Error Rate Check

Checking Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button and display "CPLAY MID".
4. The display changes to "C1 = □□□□ AD = □□".
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the EDIT/NO button, stop playback, press the ⏏EJECT button, and remove the continuously recorded disc.

5-10. FOCUS BIAS CHECK

Change the focus bias and check the focus tolerance amount.

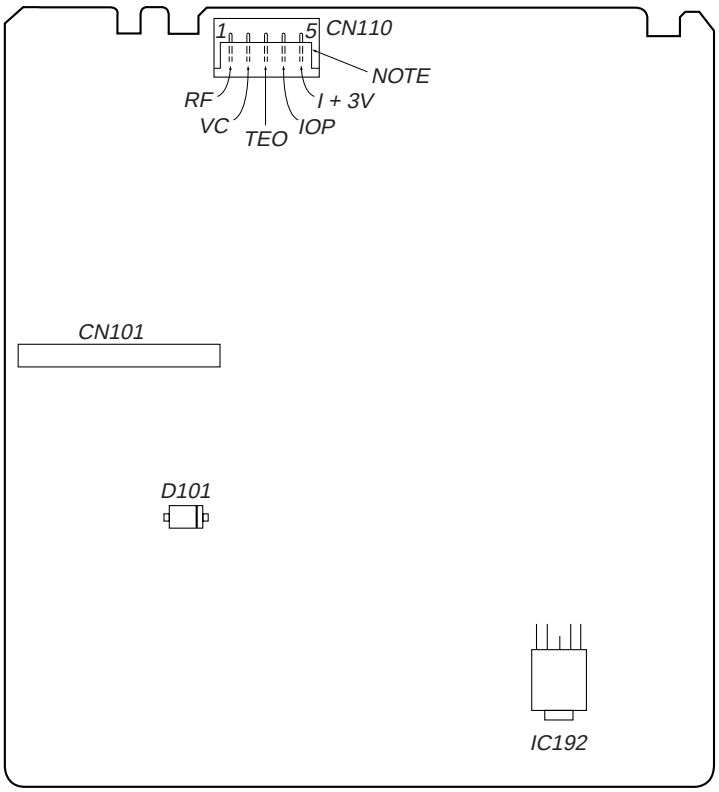
Checking Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. Press the EDIT/NO button when "C1 = □□□□ AD = □□" is displayed.
5. Rotate the AMS knob and display "FBIAS CHECK".
6. Press the YES button and display " □□□□/□□ c = □□".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C1 error is below 50 and ADER is 00.
7. Press the YES button and display " □□□□/□□ b = □□".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
8. Press the YES button and display " □□□□/□□ a = □□".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
9. Press the EDIT/NO button, next press the ⏏EJECT button, and remove the continuously recorded disc.

Note 1 : If the C1 error and ADER are above 00 at points a (step 8. in the above) or b (step 7. in the above), the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

5-11. ADJUSTING POINTS AND CONNETING POINTS

[BD BOARD] (SIDE A)

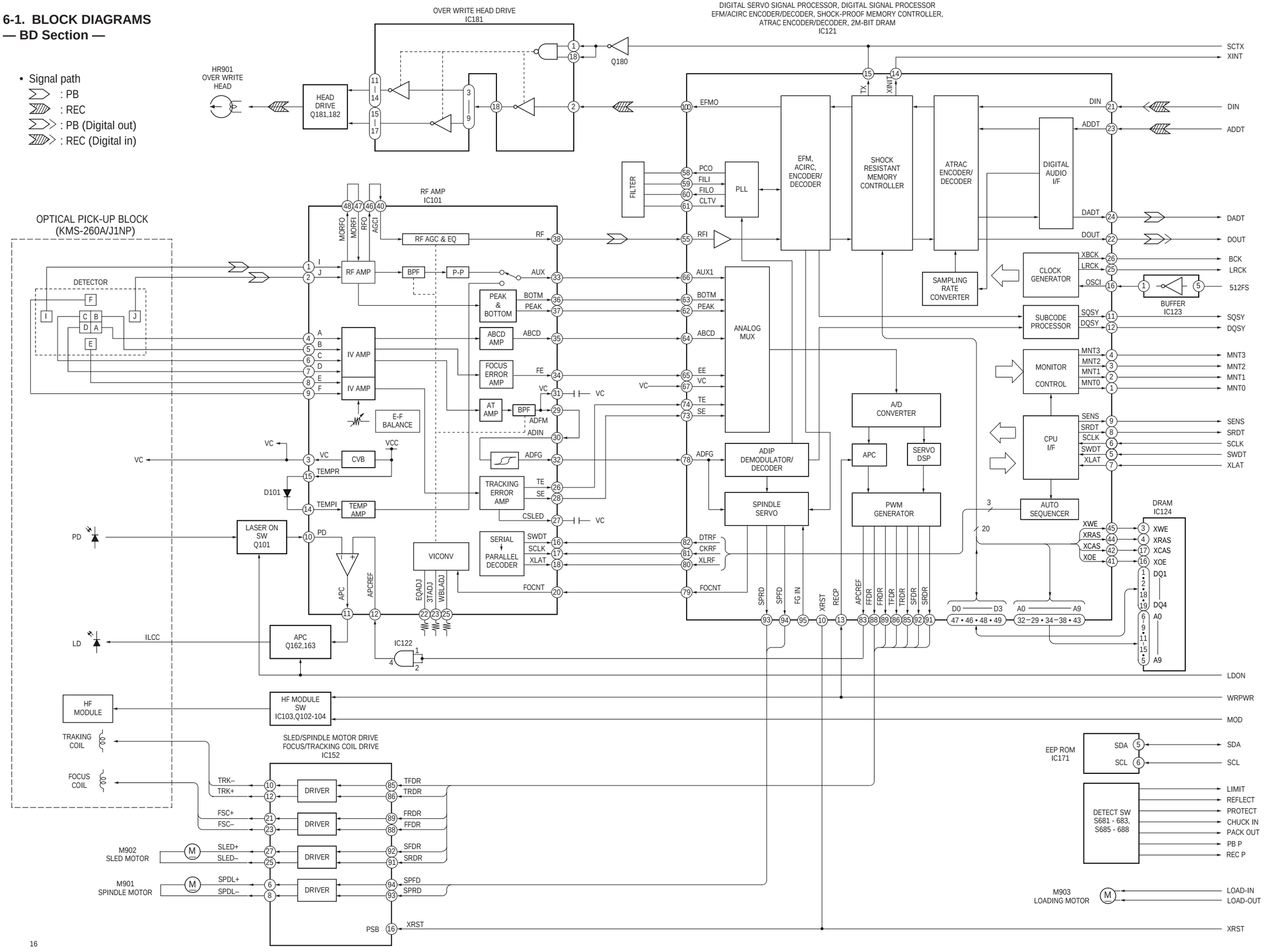


NOTE : It is useful to use the jig. for checking the waveform.
(Refer to Servicing Note on page 4.)

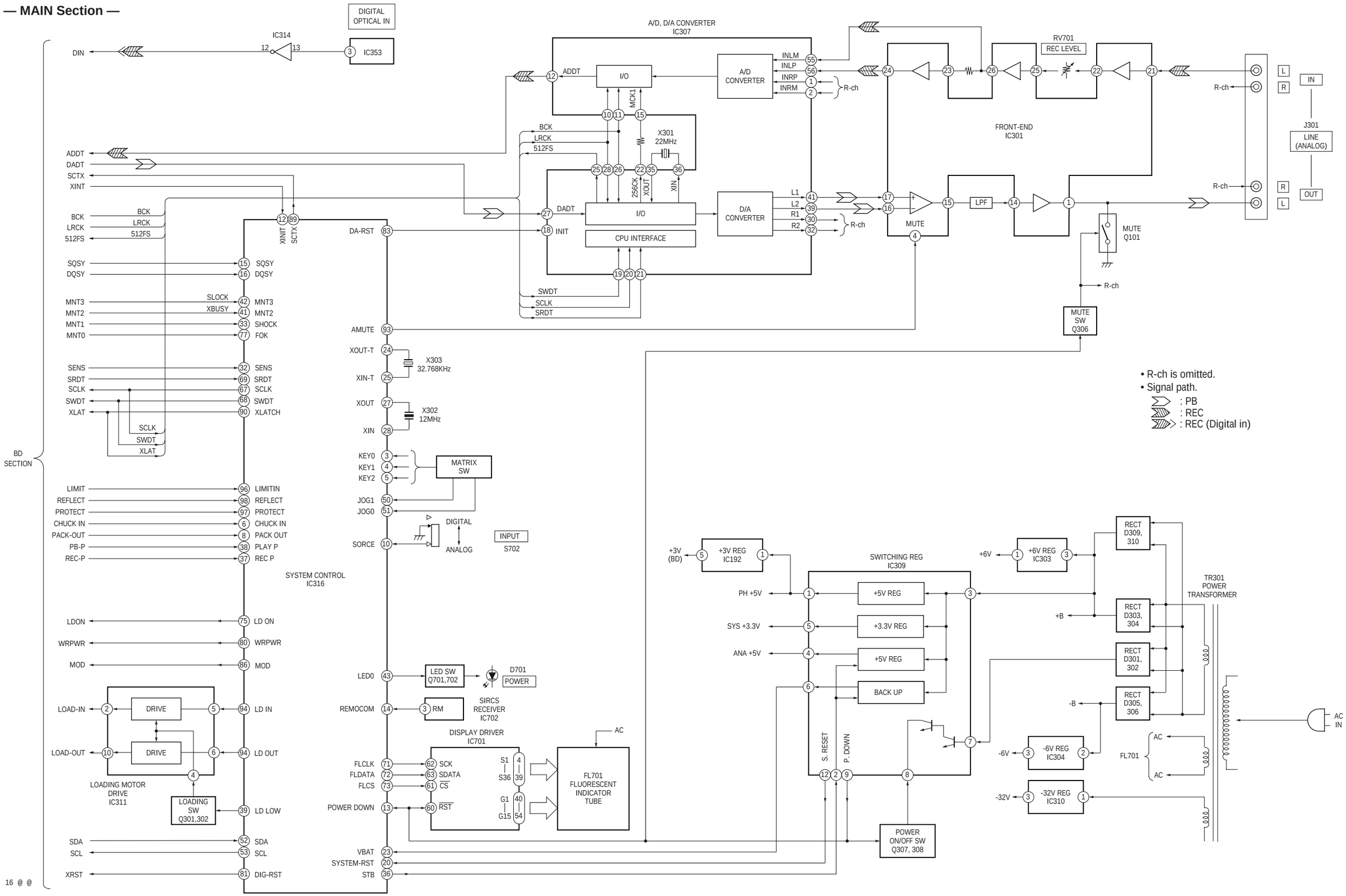
SECTION 6
DIAGRAMS

6-1. BLOCK DIAGRAMS
— BD Section —

- Signal path
  - : PB
  - : REC
  - : PB (Digital out)
  - : REC (Digital in)

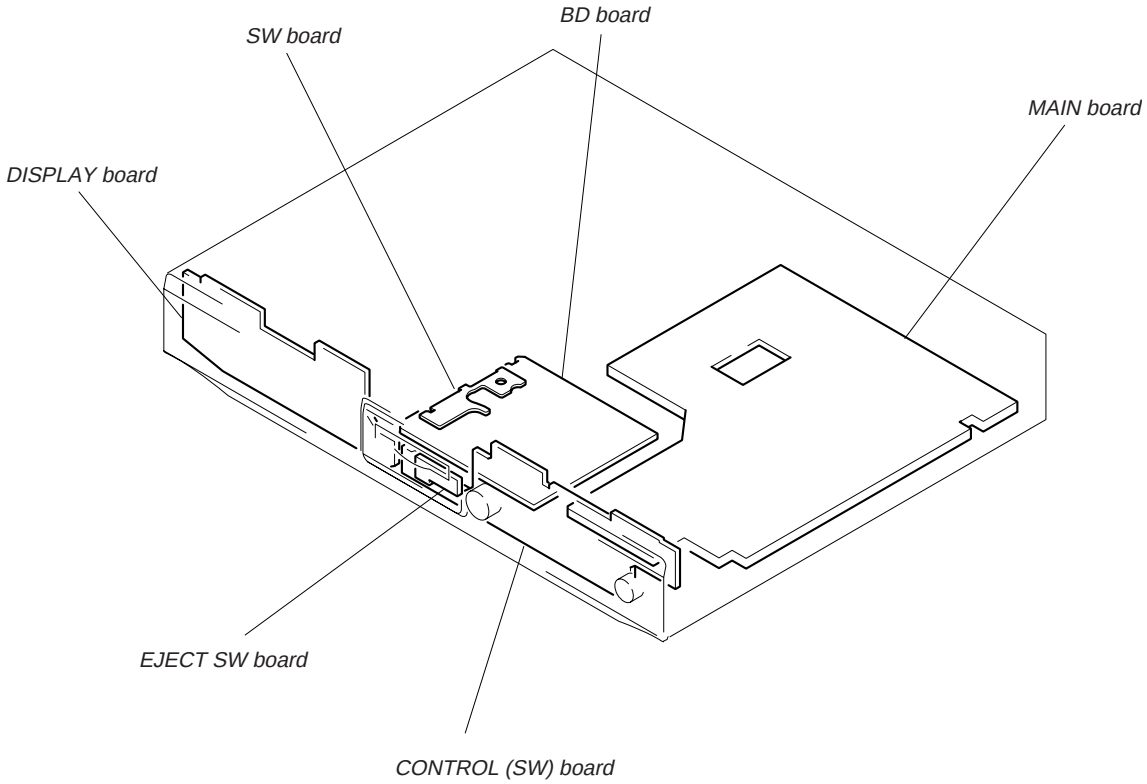


— MAIN Section —



- R-ch is omitted.
- Signal path.
  : PB
  : REC
  : REC (Digital in)

6-2. CIRCUIT BOARDS LOCATION



THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS. (In addition to this necessary note is printed in each block.)

For schematic diagrams.

Note:

- All capacitors are in µF unless otherwise noted. pF: µµF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- % : indicates tolerance.
- △ : internal component.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.

Note:	**Note:**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- B+ : B+ Line.
- B– : B– Line.
- : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
  No mark : FM
  ( ) : PLAY
  < > : REC
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
- Circled numbers refer to waveforms.
- Signal path.

:PB
:REC
:REC(DIGITAL IN)
:REC(DIGITAL OUT)

For printed wiring boards.

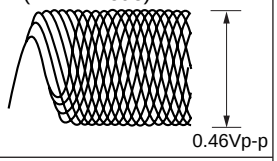
Note:

- ○——— : parts extracted from the component side.
- ○ : Through hole.
- △ : internal component.
- : Pattern from the side which enables seeing.
- ■ : parts mounted on the conductor side.

• Waveform

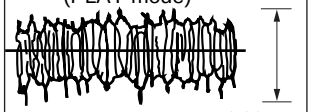
• BD SECTION

① IC101 ①,② I, J (PLAY mode)

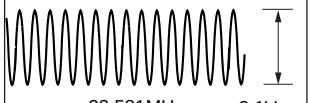


② IC101 ④ A (PLAY mode)

③ IC101 ⑧,⑨ E, F (PLAY mode)

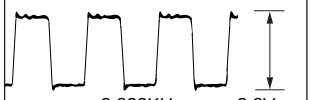


④ IC121 ⑯ OSCI

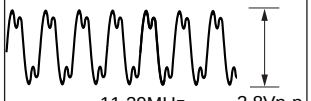


⑤ IC121 ㉕ LRCK

⑥ IC121 ㉖ XBCK



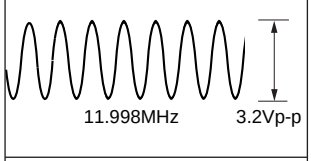
⑦ IC121 ㉗ FS256



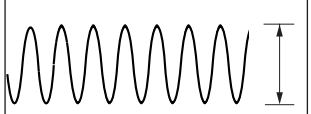
⑧ IC121 ㉚ FS4

• MAIN SECTION

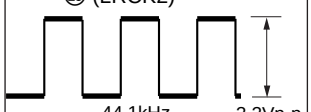
① IC316 ㉗ (XOUT)



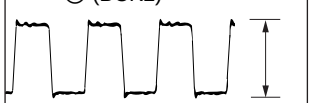
② IC316 ㉔ (XOUT-T)



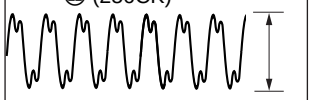
③ IC307 ⑩ (LRCK1), ㉘ (LRCK2)



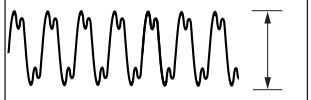
④ IC307 ⑪ (BCK1), ㉖ (BCK2)



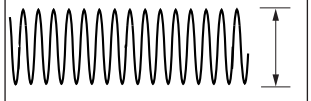
⑤ IC307 ⑮ (MCK1), ㉒ (256CK)



⑥ IC307 ㉕ (512FS)

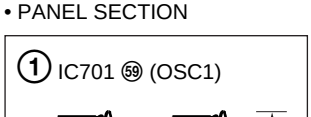


⑦ IC307 ㉟ (XOUT)



• PANEL SECTION

① IC701 ㊾ (OSC1)

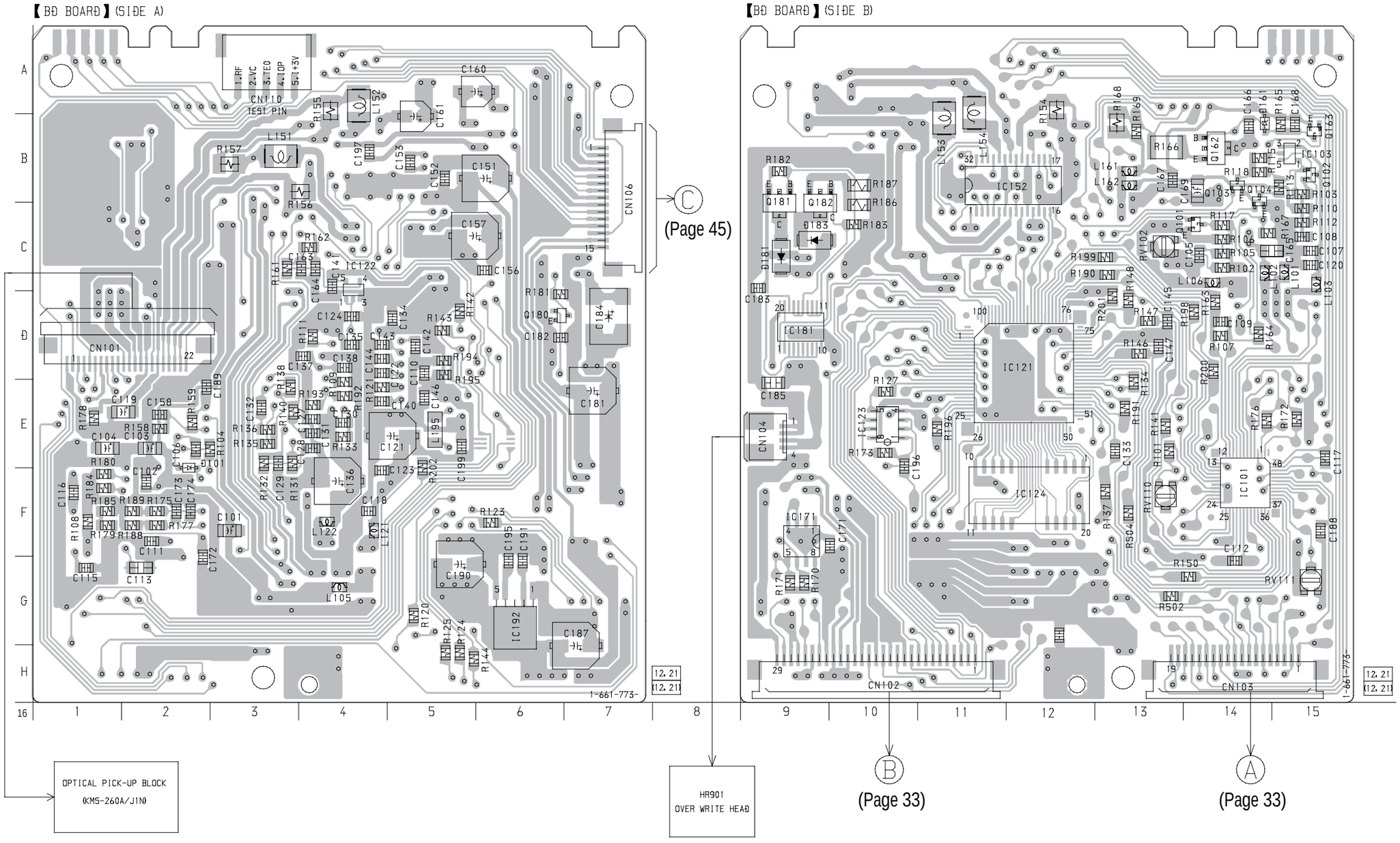


6-3. Printed Wiring Board — BD Section —

• See page 25 for Circuit Boards Location.

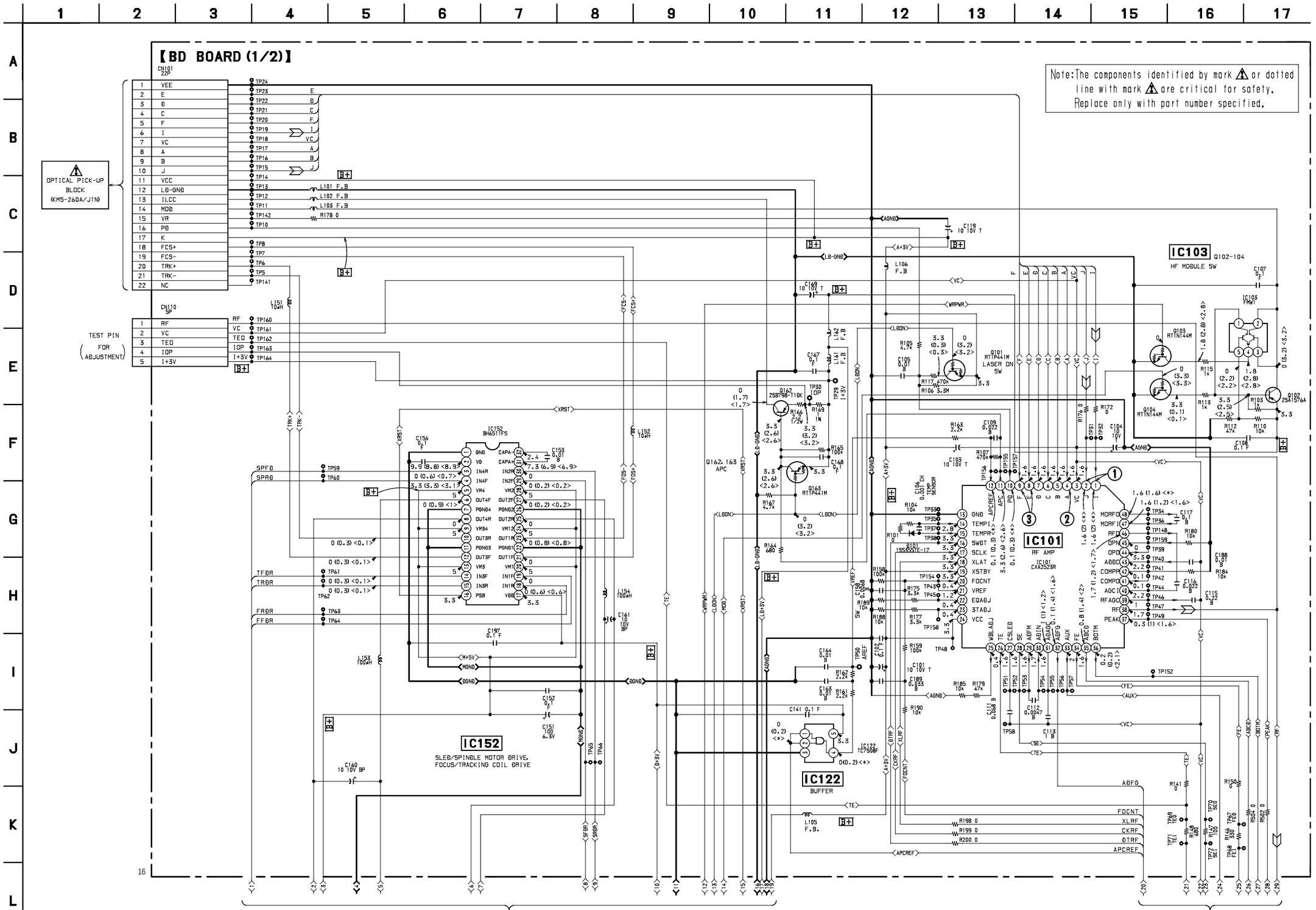
• **Semiconductor Location**

Ref. No.	Location
D101	E-3
D181	C-9
D183	C-9
IC101	F-14
IC103	B-15
IC121	D-12
IC122	C-4
IC123	E-10
IC124	F-12
IC152	B-12
IC171	F-9
IC181	D-9
IC192	G-6
Q101	C-14
Q102	B-15
Q103	B-14
Q104	B-14
Q162	B-14
Q163	B-15
Q180	D-6
Q181	B-9
Q182	B-9



6-4. Schematic Diagram — BD Section (1/2)—

• See page 26 for Waveforms. • See page 49 for IC Block Diagrams. • See page 54 for IC Pin Functions.



6-5. Schematic Diagram — BD Section (2/2) —

• See page 26 for Waveforms. • See page 49 for IC Block Diagrams. • See page 54 for IC Pin Functions.

【BD BOARD (2/2)】

IC123 512FS BUFFER

IC171 EEPROM

IC192 +3V REG

IC121 DIGITAL SIGNAL PROCESSOR, DIGITAL SERVO SIGNAL PROCESSOR, EFM/ACIRC ENCODER/DECODER, SHOCK PROOF MEMORY CONTROLER, ATRAC ENCODER/DECODER, 2M BIT DRAM

IC124 Ø RAM

IC181 OVER WRITE HEAD DRIVE

Q180 RT1N141M INVERTER

Q181, 182 OVER WRITE HEAD DRIVE

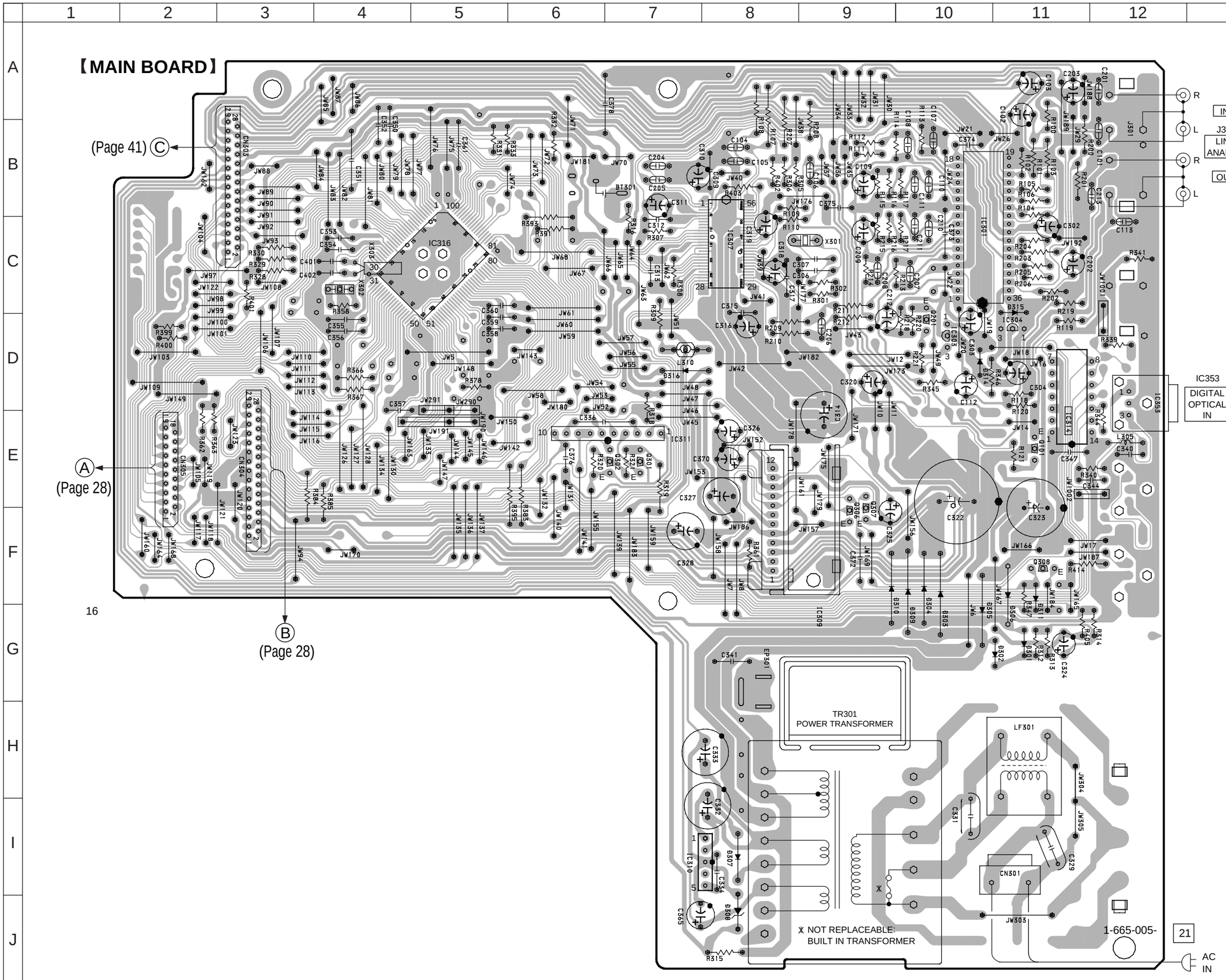
1 (Page 29) 2 (Page 30) B (Page 36) C (Page 47) A (Page 35)

6-6. Printed Wiring Board — Main Section —

• See page 25 for Circuit Boards Location.

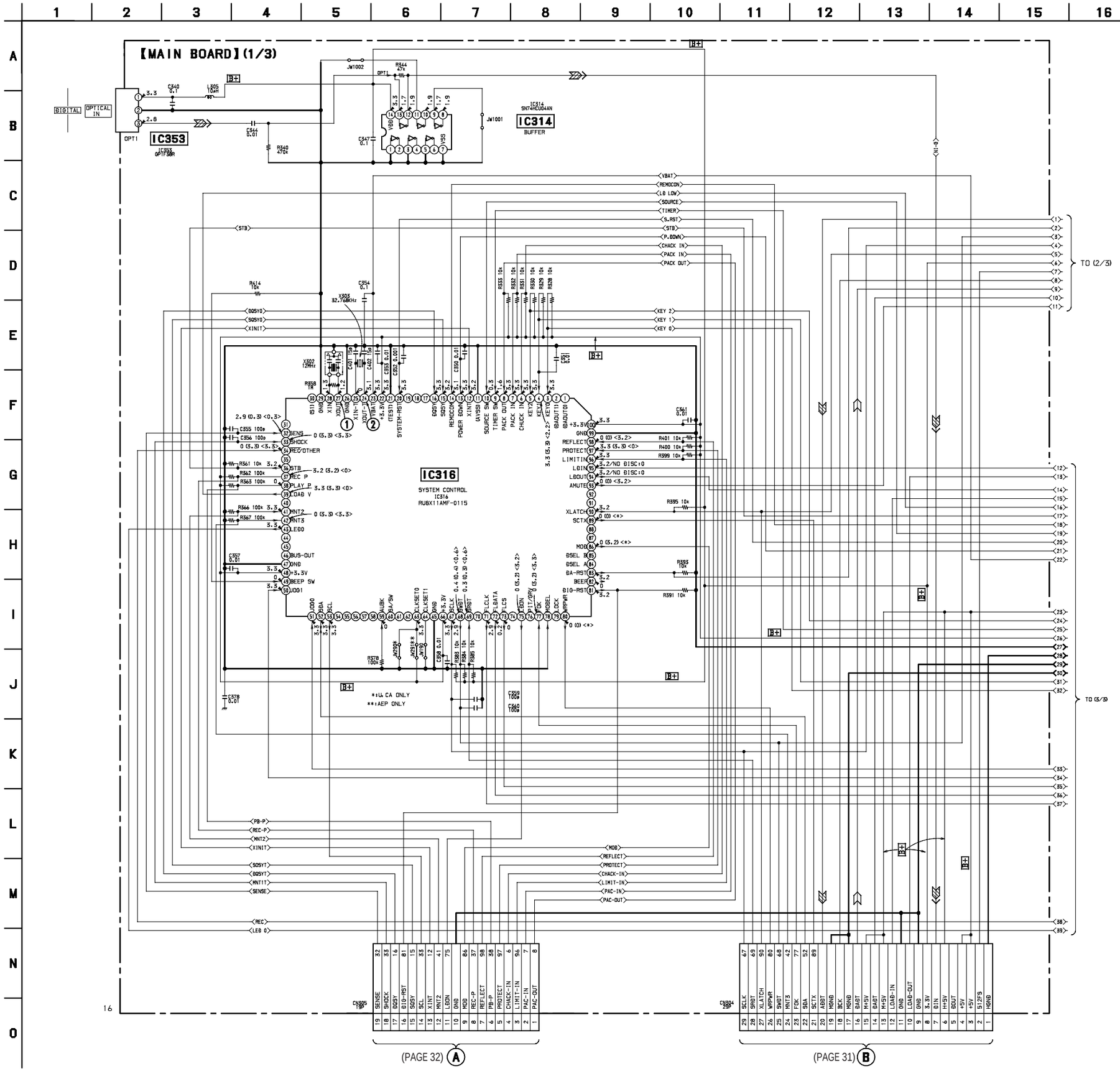
• **Semiconductor Location**

Ref. No.	Location
D301	G-11
D302	G-11
D303	G-10
D304	G-10
D305	G-10
D306	G-10
D307	I-8
D308	I-8
D309	G-9
D310	G-9
D311	G-11
D314	D-10
D315	D-11
D316	D-7
IC301	C-10
IC303	D-10
IC304	D-11
IC307	C-8
IC309	G-8
IC310	I-7
IC311	E-7
IC314	E-11
IC316	C-5
IC353	E-12
Q101	E-11
Q201	D-10
Q301	E-7
Q302	E-7
Q306	F-9
Q307	F-9
Q308	F-11



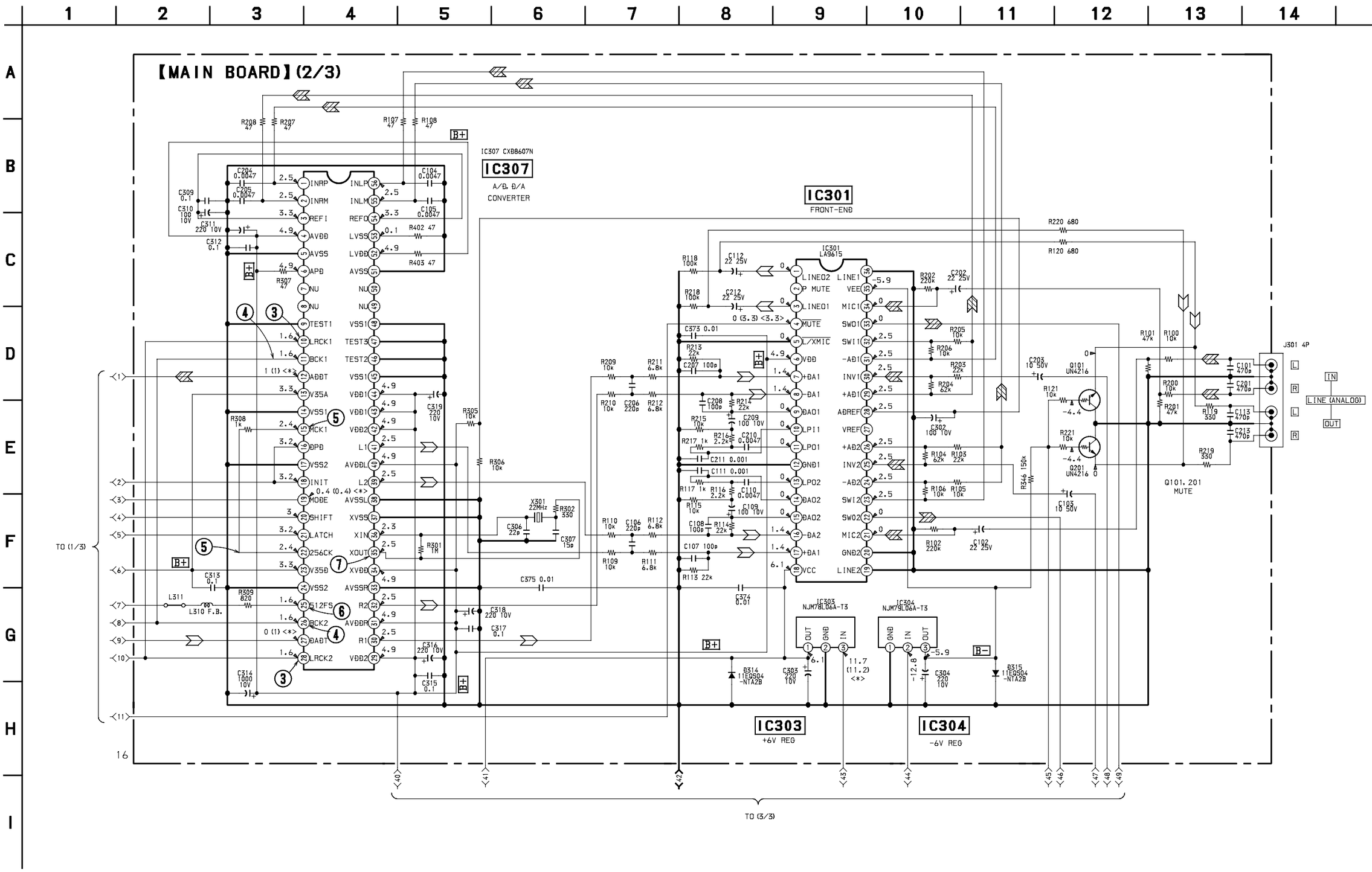
6-7. Schematic Diagram — Main Section (1/3) —

• See page 26 for Waveforms • See page 54 for IC Pin Functions.



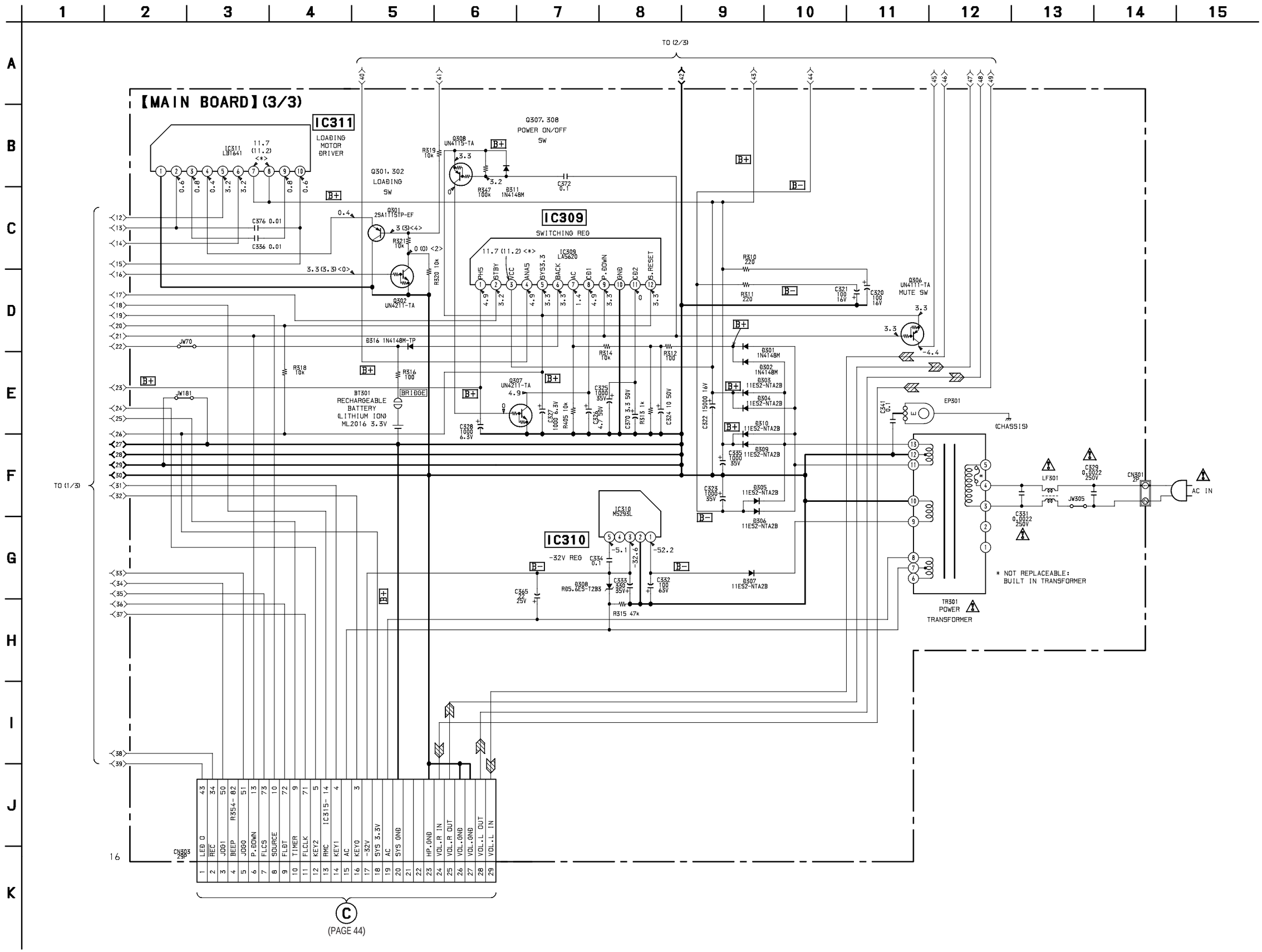
6-8. Schematic Diagram — Main Section (2/3) —

• See page 26 for Waveforms. • See page 49 for IC Block Diagrams. • See page 54 for IC Pin Functions.



6-9. Schematic Diagram — Main Section (3/3) —

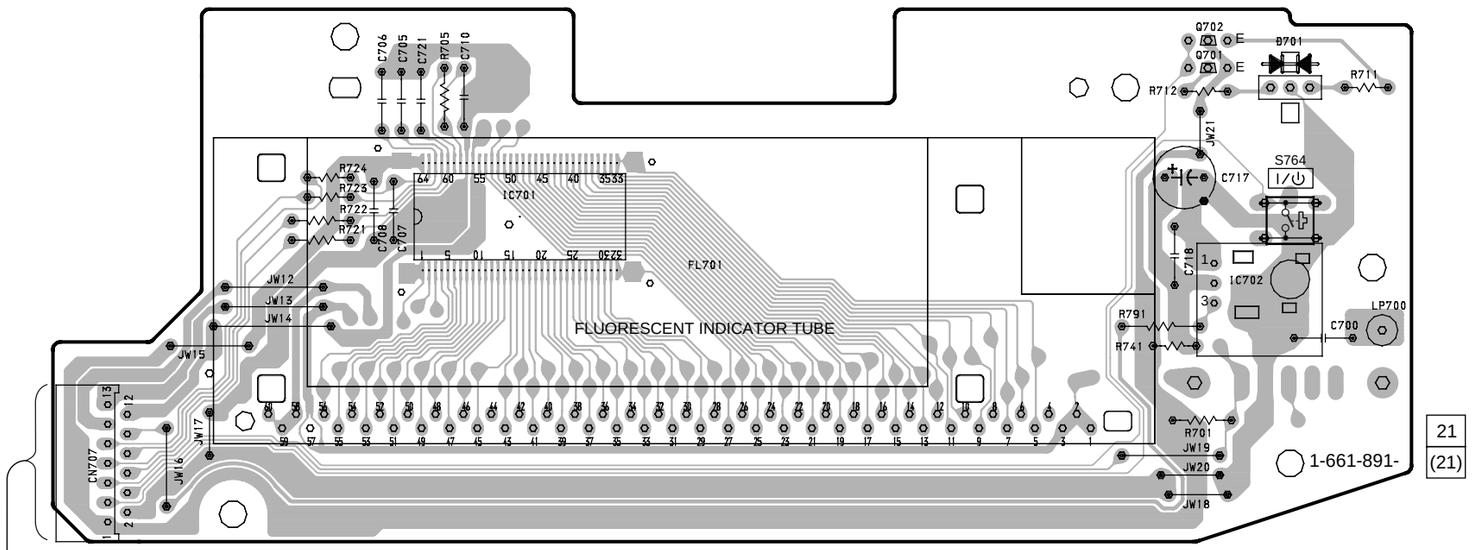
• See page 49 for IC Block Diagram.



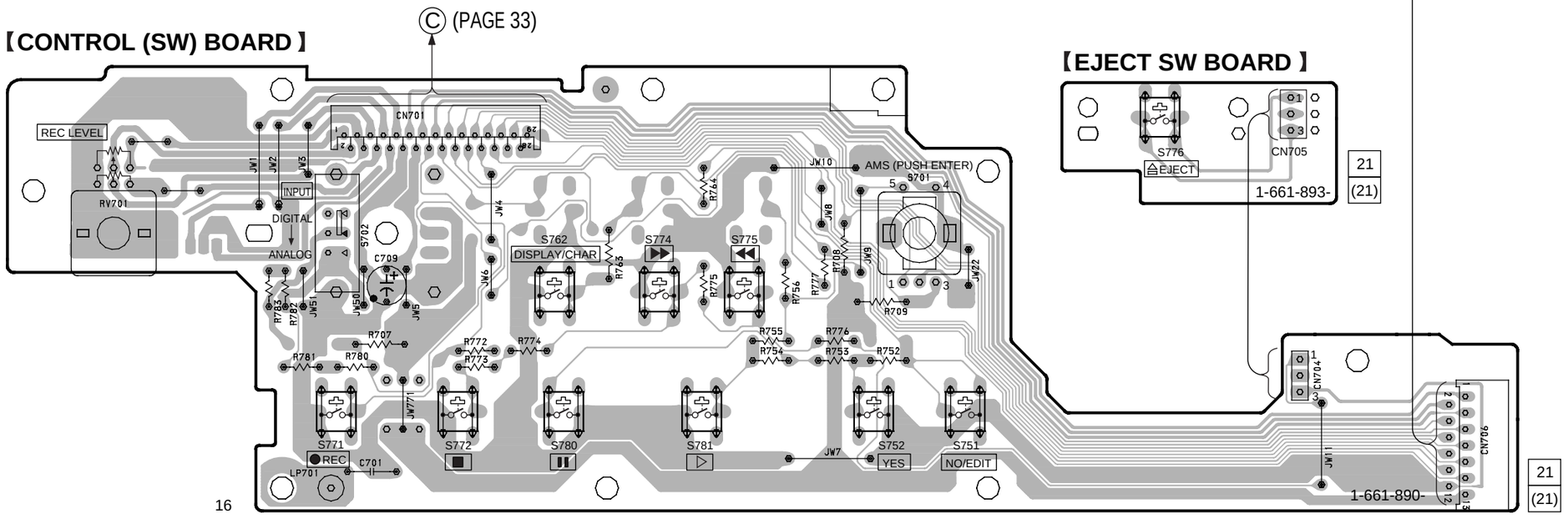
6-10. Printed Wiring Board — DISPLAY Section —

• See page 25 for Circuit Boards Location.

【DISPLAY BOARD】



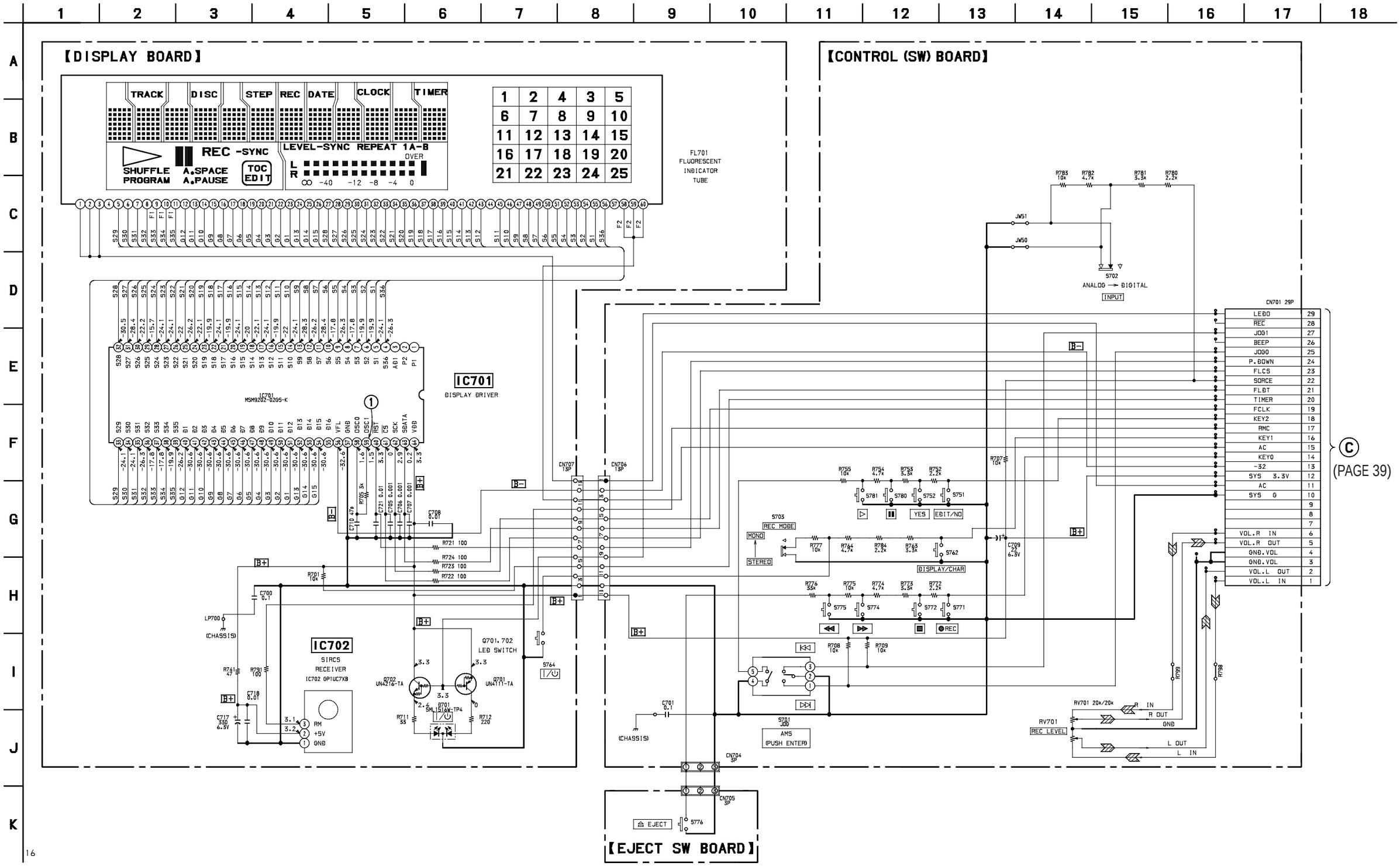
【CONTROL (SW) BOARD】



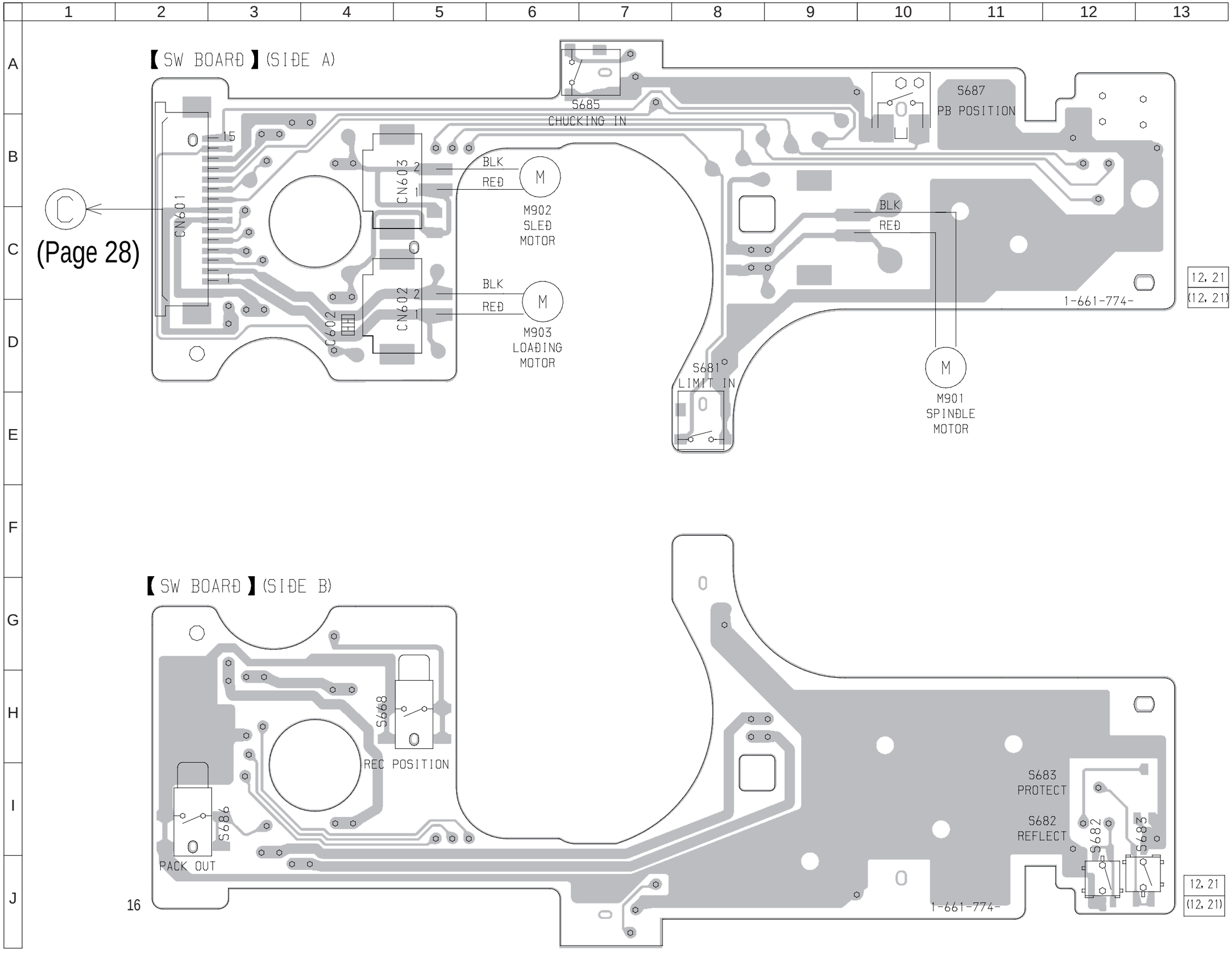
【EJECT SW BOARD】

6-11. Schematic Diagram — DISPLAY Section —

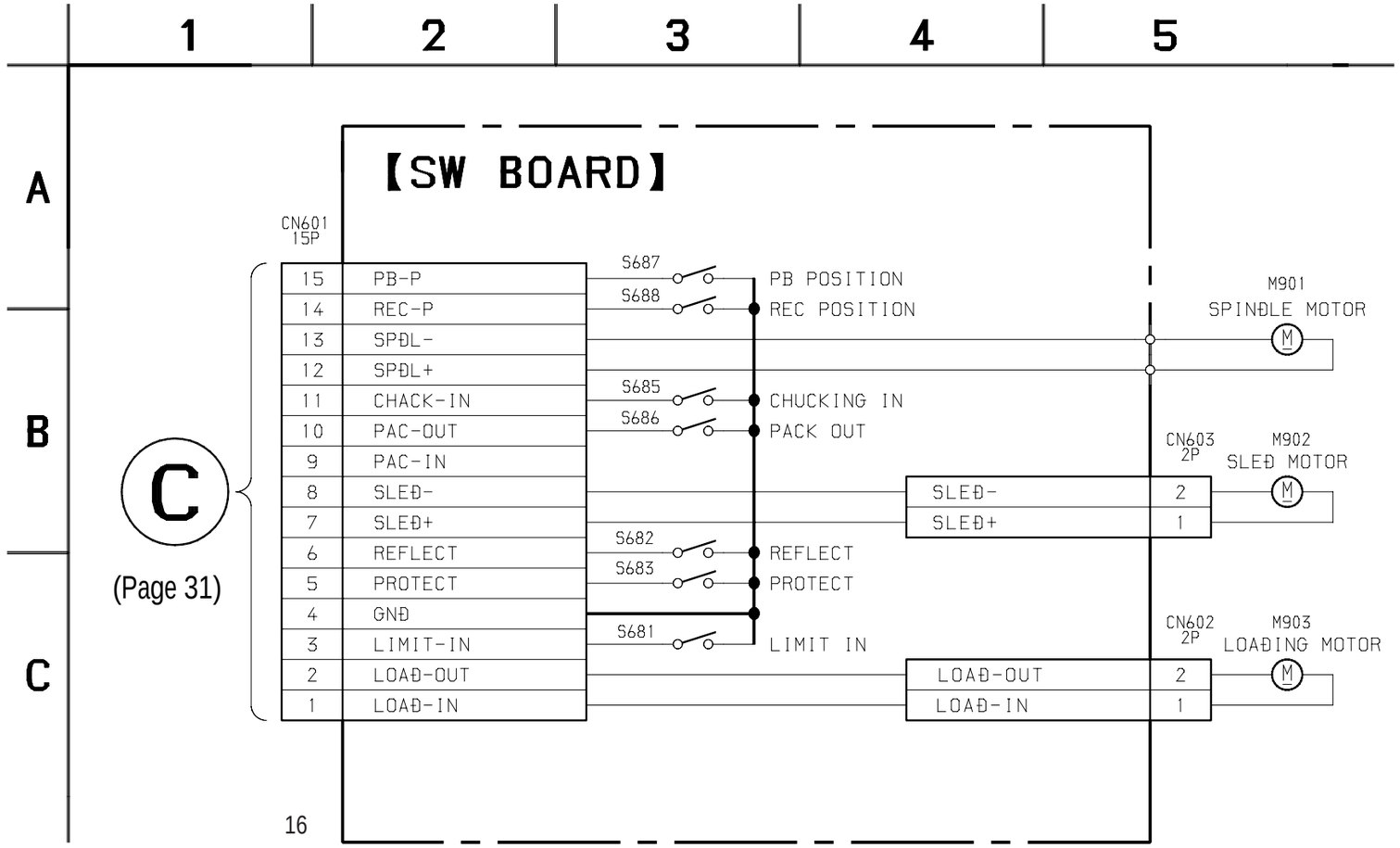
• See page 26 for Waveforms.



6-12. Printed Wiring Board — Switch Section — • See page 25 for Circuit Boards Location.



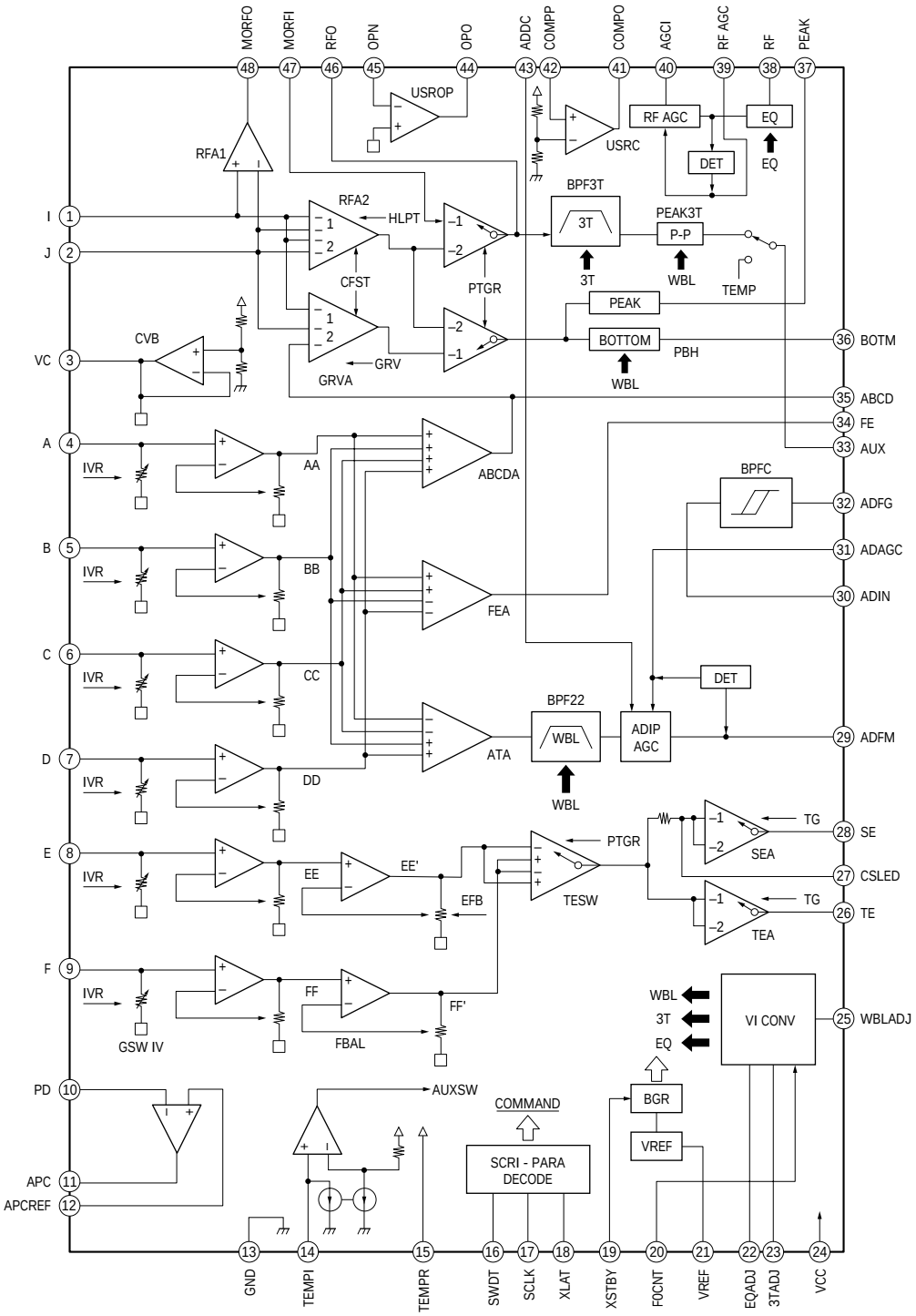
6-13. Schematic Diagram — Switch Section —

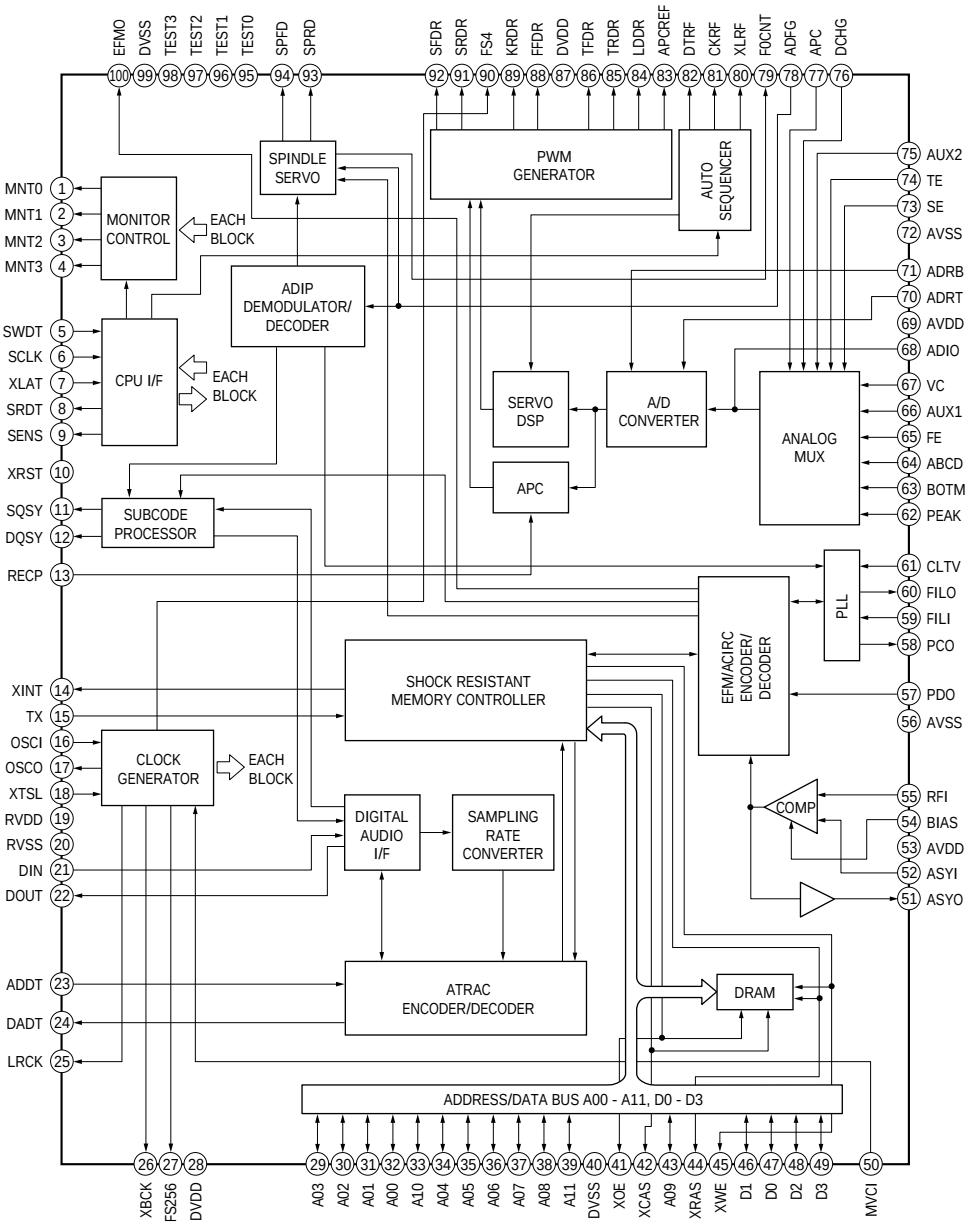


6-14. IC BLOCK DIAGRAMS

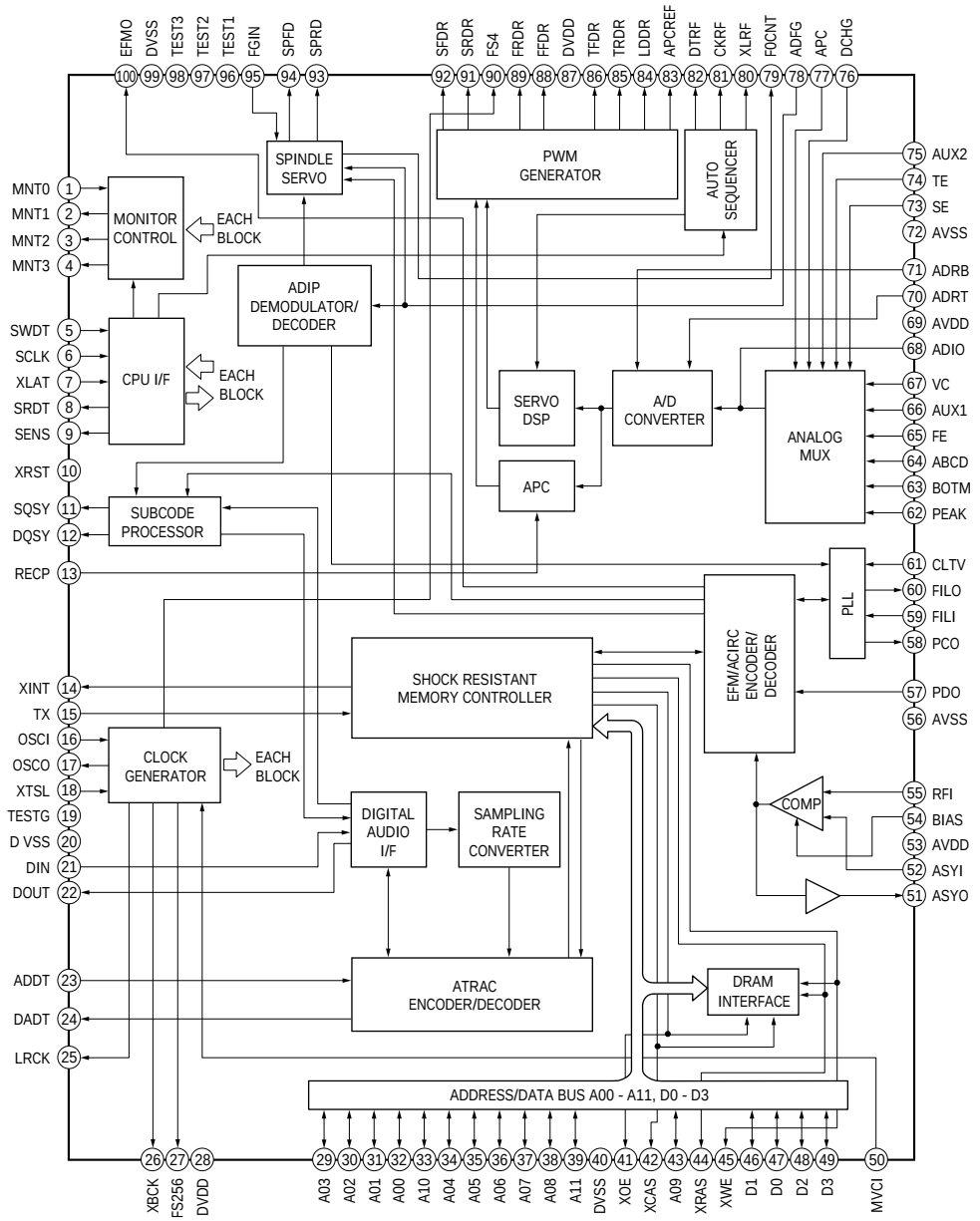
• BD section

IC101 CXA2523R

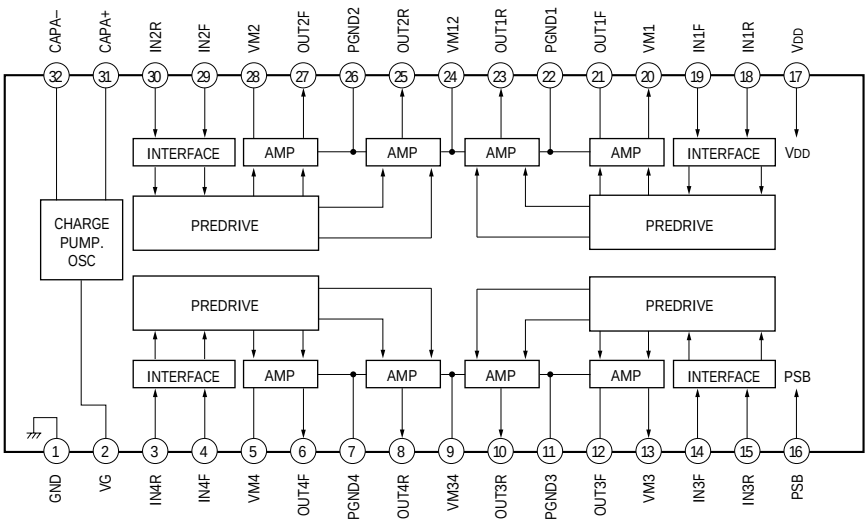



EFMO 100
DVSS 99
TEST3 98
TEST2 97
TEST1 96
TEST0 95
SPFD 94
SPRD 93
SFDR 92
SRDR 91
FS4 90
KRDR 89
FFDR 88
DVDD 87
TFDR 86
TRDR 85
LDDR 84
APCREF 83
DTRF 82
CKRF 81
XLRF 80
FOCNT 79
ADFG 78
APC 77
DCHG 76
SPINDLE SERVO
PWM GENERATOR
AUTO SEQUENCER
MNT0 1
MNT1 2
MNT2 3
MNT3 4
MONITOR CONTROL
EACH BLOCK
ADIP DEMODULATOR/ DECODER
SWDT 5
SCLK 6
XLAT 7
SRDT 8
SENS 9
CPU I/F
EACH BLOCK
SERVO DSP
A/D CONVERTER
ANALOG MUX
APC
XRST 10
SQSY 11
DQSY 12
SUBCODE PROCESSOR
RECP 13
PLL
EFM/ACIRC ENCODER/ DECODER
SHOCK RESISTANT MEMORY CONTROLLER
XINT 14
TX 15
OSCI 16
OSCO 17
XTSL 18
RVDD 19
RVSS 20
DIN 21
DOUT 22
CLOCK GENERATOR
EACH BLOCK
DIGITAL AUDIO I/F
SAMPLING RATE CONVERTER
COMP
ADDT 23
DADT 24
LRCK 25
ATRAC ENCODER/DECODER
DRAM
ADDRESS/DATA BUS A00 - A11, D0 - D3
AUX2 75
TE 74
SE 73
AVSS 72
ADRB 71
ADRT 70
AVDD 69
ADIO 68
VC 67
AUX1 66
FE 65
ABCD 64
BOTM 63
PEAK 62
CLTV 61
FILO 60
FILI 59
PCO 58
PDO 57
AVSS 56
RFI 55
BIAS 54
AVDD 53
ASYI 52
ASYO 51
XBCK 26
FS256 27
DVDD 28
A03 29
A02 30
A01 31
A00 32
A10 33
A04 34
A05 35
A06 36
A07 37
A08 38
A11 39
DVSS 40
XOE 41
XCAS 42
A09 43
XRAS 44
XWE 45
D1 46
D0 47
D2 48
D3 49
MVCI 50

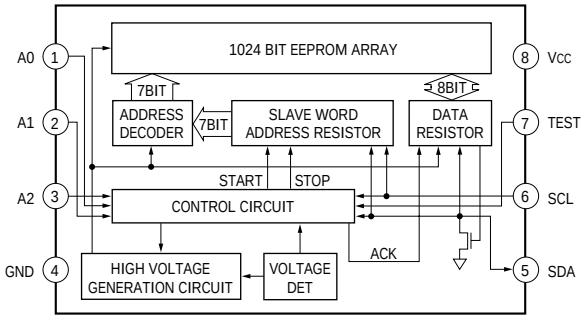
IC121 CXD2652AR



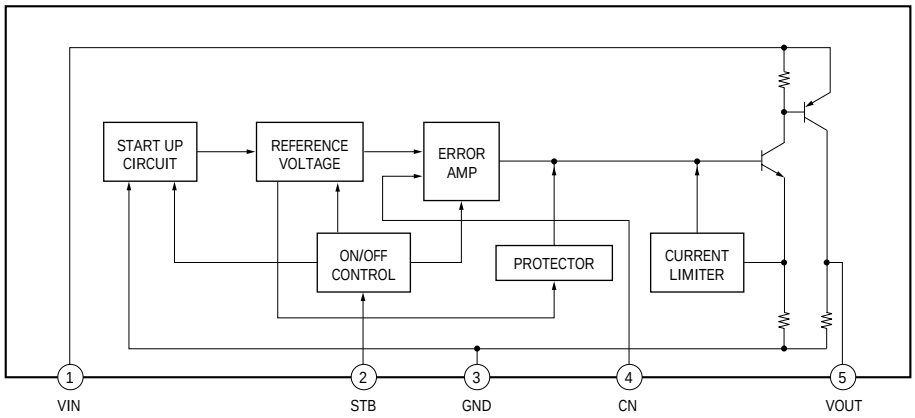
IC152 BH6511FS



IC171 XL24C01AF

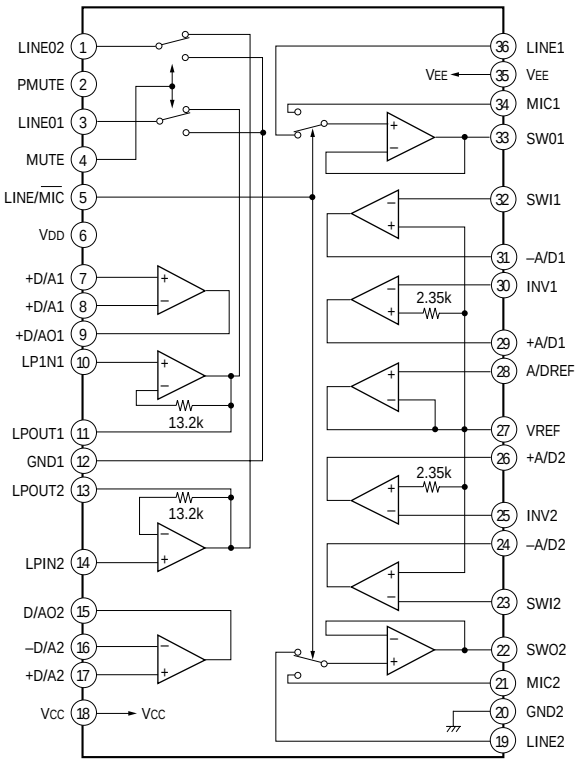


IC192 L88MS33T

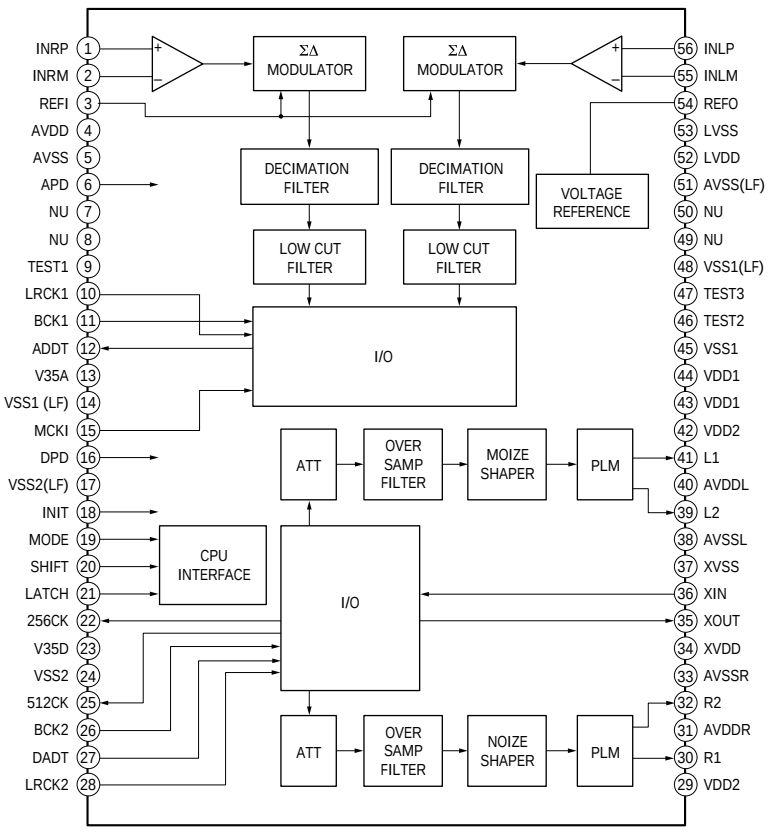


• Main section

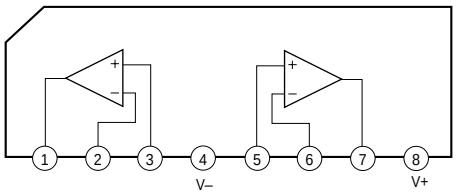
IC301 LA9615



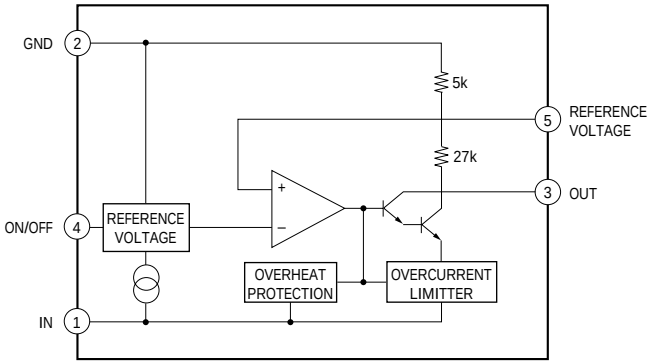
IC307 CXD8607N



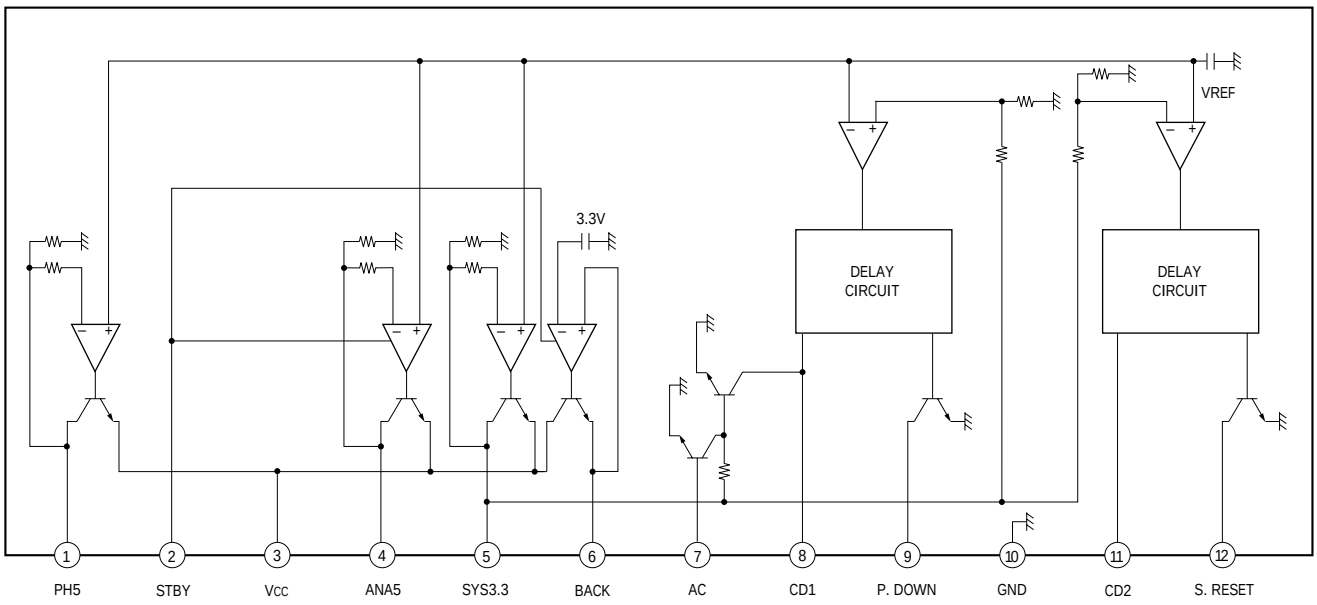
IC308 M5218AL



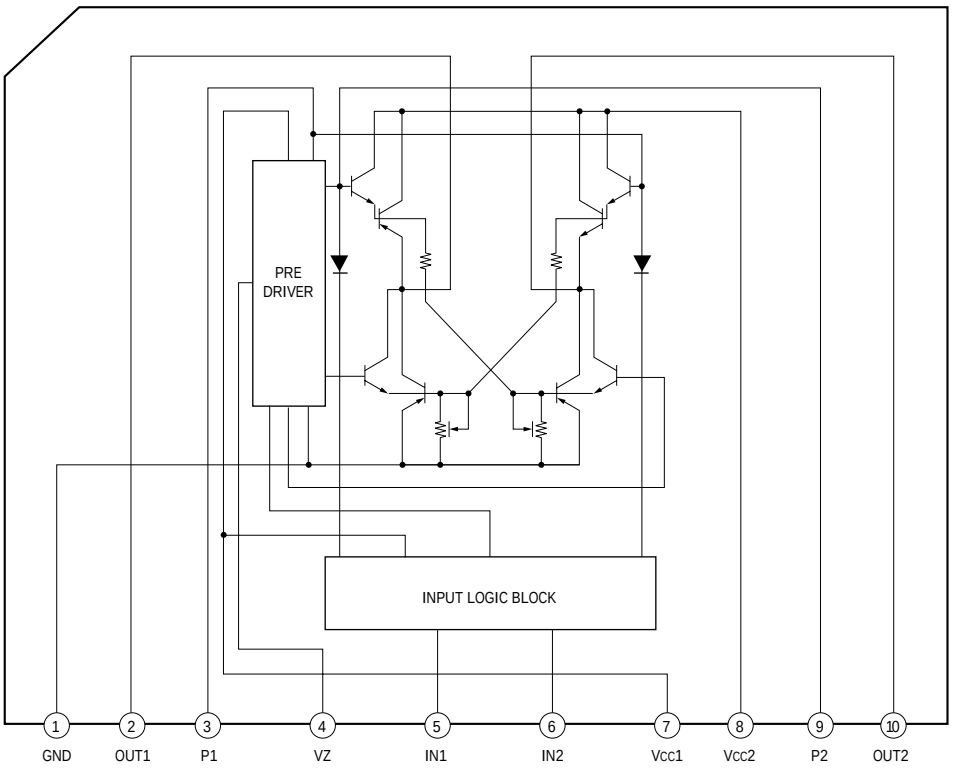
IC310 M5293L



IC309 LA5620



IC311 LB1641



6-15. IC PIN FUNCTIONS

• IC101 RF Amplifier (CXA2523R)

Pin No.	Pin Name	I/O	Function
1	I	I	I-V converted RF signal I input
2	J	I	I-V converted RF signal J input
3	VC	O	Middle point voltage (+1.5V) generation output
4 to 9	A to F	I	Signal input from the optical pick-up detector
10	PD	I	Light amount monitor input
11	APC	O	Laser APC output
12	APCREF	I	Reference voltage input for setting laser power
13	GND	—	Ground
14	TEMPI	I	Temperature sensor connection
15	TEMPR	O	Reference voltage output for the temperature sensor
16	SWDT	I	Serial data input from the CXD2650R or CXD2652AR
17	SCLK	I	Serial clock input from the CXD2650R or CXD2652AR
18	XLAT	I	Latch signal input from the CXD2650R or CXD2652AR "L": Latch
19	XSTBY	I	Stand by signal input "L": Stand by
20	F0CNT	I	Center frequency control voltage input of BPF22, BPF3T, EQ from the CXD2650R or CXD2652AR
21	VREF	O	Reference voltage output (Not used)
22	EQADJ	I/O	Center frequency setting pin for the internal circuit EQ
23	3TADJ	I/O	Center frequency setting pin for the internal circuit BPF3T
24	Vcc	—	+3V power supply
25	WBLADJ	I/O	Center frequency setting pin for the internal circuit BPF22
26	TE	O	Tracking error signal output to the CXD2650R or CXD2652AR
27	CSLED	—	External capacitor connection pin for the sled error signal LPF
28	SE	O	Sled error signal output to the CXD2650R or CXD2652AR
29	ADFM	O	FM signal output of ADIP
30	ADIN	I	ADIP signal comparator input ADFM is connected with AC coupling
31	ADAGC	—	External capacitor connection pin for AGC of ADIP
32	ADFG	O	ADIP duplex signal output to the CXD2650R or CXD2652AR
33	AUX	O	I_3 signal/temperature signal output to the CXD2650R or CXD2652AR (Switching with a serial command)
34	FE	O	Focus error signal output to the CXD2650R or CXD2652AR
35	ABCD	O	Light amount signal output to the CXD2650R or CXD2652AR
36	BOTM	O	RF/ABCD bottom hold signal output to the CXD2650R or CXD2652AR
37	PEAK	O	RF/ABCD peak hold signal output to the CXD2650R or CXD2652AR
38	RF	O	RF equalizer output to the CXD2650R or CXD2652AR
39	RFAGC	—	External capacitor connection pin for the RF AGC circuit
40	AGCI	I	Input to the RF AGC circuit The RF amplifier output is input with AC coupling
41	COMPO	O	User comparator output (Not used)
42	COMPP	I	User comparator input (Fixed at "L")
43	ADDC	I/O	External capacitor pin for cutting the low band of the ADIP amplifier
44	OPO	O	User operation amplifier output (Not used)
45	OPN	I	User operation amplifier inversion input (Fixed at "L")
46	RFO	O	RF amplifier output
47	MORFI	I	Groove RF signal is input with AC coupling
48	MORFO	O	Groove RF signal output

• Abbreviation
APC: Auto Power Control
AGC: Auto Gain Control

• **IC121 Digital Signal Processor, Digital Servo Signal Processor, EFM/ACIRC Encoder/Decoder, Shock-proof Memory Controller, ATRAC Encoder/Decoder, 2M Bit DRAM (CXD2650R or CXD2652AR)**

Pin No.	Pin Name	I/O	Function
1	MNT0 (FOK)	O	FOK signal output to the system control "H" is output when focus is on
2	MNT1 (SHCK)	O	Track jump detection signal output to the system control
3	MNT2 (XBUSY)	O	Monitor 2 output to the system control
4	MNT3 (SLOC)	O	Monitor 3 output to the system control
5	SWDT	I	Writing data signal input from the system control
6	SCLK	I (S)	Serial clock signal input from the system control
7	XLAT	I (S)	Serial latch signal input from the system control
8	SRDT	O (3)	Reading data signal output to the system control
9	SENS	O (3)	Internal status (SENSE) output to the system control
10	XRST	I (S)	Reset signal input from the system control "L": Reset
11	SQSY	O	Subcode Q sync (SCOR) output to the system control "L" is output every 13.3 msec. Almost all, "H" is output
12	DQSY	O	Digital In U-bit CD format subcode Q sync (SCOR) output to the system control "L" is output every 13.3 msec Almost all, "H" is output
13	RECP	I	Laser power switching input from the system control "H": Recording, "L": Playback
14	XINT	O	Interrupt status output to the system control
15	TX	I	Recording data output enable input from the system control
16	OSCI	I	System clock input (512Fs=22.5792 MHz)
17	OSCO	O	System clock output (512Fs=22.5792 MHz) (Not used)
18	XTSL	I	System clock frequency setting "L": 45.1584 MHz, "H": 22.5792 MHz (Fixed at "H")
19	DVDD	—	+3V power supply (Digital)
20	DVSS	—	Ground (Digital)
21	DIN	I	Digital audio input (Optical input)
22	DOUT	O	Digital audio output (Optical output)
23	ADDT	I	Data input from the A/D converter
24	DADT	O	Data output to the D/A converter
25	LRCK	O	LR clock output for the A/D and D/A converter (44.1 kHz)
26	XBCK	O	Bit clock output to the A/D and D/A converter (2.8224 MHz)
27	FS256	O	11.2896 MHz clock output (Not used)
28	DVDD	—	+3V power supply (Digital)
29 to 32	A03 to A00	O	DRAM address output (Used : CXD2652AR, Not used : CXD2650R)
33	A10	O	
34 to 38	A04 to A08	O	
39	A11	O	
40	DVSS	—	Ground (Digital)
41	XOE	O	Output enable output for DRAM (Used : CXD2652AR, Not used : CXD2650R)
42	XCAS	O	$\overline{\text{CAS}}$ signal output for DRAM (Used : CXD2652AR, Not used : CXD2650R)
43	A09	O	Address output for DRAM (Used : CXD2652AR, Not used : CXD2650R)
44	XRAS	O	$\overline{\text{RAS}}$ signal output for DRAM (Used : CXD2652AR, Not used : CXD2650R)
45	XWE	O	Write enable signal output for DRAM (Used : CXD2652AR, Not used : CXD2650R)

* I (S) stands for Schmidt input, I (A) for analog input, O (3) for 3-state output, and O (A) for analog output in the column I/O

Pin No.	Pin Name	I/O	Function
46	D1	I/O	Data input/output for DRAM (Used : CXD2652AR, Not used : CXD2650R)
47	D0	I/O	
48, 49	D2, D3	I/O	
50	MVCI	I (S)	Clock input from an external VCO (Fixed at “L”)
51	ASYO	O	Playback EFM duplex signal output
52	ASYI	I (A)	Playback EFM comparator slice level input
53	AVDD	—	+3V power supply (Analog)
54	BIAS	I (A)	Playback EFM comparator bias current input
55	RFI	I (A)	Playback EFM RF signal input
56	AVSS	—	Ground (Analog)
57	PDO	O (3)	Phase comparison output for the clock playback analog PLL of the playback EFM (Not used)
58	PCO	O (3)	Phase comparison output for the recording/playback EFM master PLL
59	FILI	I (A)	Filter input for the recording/playback EFM master PLL
60	FILO	O (A)	Filter output for the recording/playback EFM master PLL
61	CLTV	I (A)	Internal VCO control voltage input for the recording/playback EFM master PLL
62	PEAK	I (A)	Light amount signal peak hold input from the CXA2523R
63	BOTM	I (A)	Light amount signal bottom hold input from the CXA2523R
64	ABCD	I (A)	Light amount signal input from the CXA2523R
65	FE	I (A)	Focus error signal input from the CXA2523R
66	AUX1	I (A)	Auxiliary A/D input
67	VC	I (A)	Middle point voltage (+1.5V) input from the CXA2523R
68	ADIO	O (A)	Monitor output of the A/D converter input signal (Not used)
69	AVDD	—	+3V power supply (Analog)
70	ADRT	I (A)	A/D converter operational range upper limit voltage input (Fixed at “H”)
71	ADRB	I (A)	A/D converter operational range lower limit voltage input (Fixed at “L”)
72	AVSS	—	Ground (Analog)
73	SE	I (A)	Sled error signal input from the CXA2523R
74	TE	I (A)	Tracking error signal input from the CXA2523R
75	AUX2	I (A)	Auxiliary A/D input (Fixed at “L”)
76	DCHG	I (A)	Connected to +3V power supply
77	APC	I (A)	Error signal input for the laser digital APC (Fixed at “L”)
78	ADFG	I (S)	ADIP duplex FM signal input from the CXA2523R (22.05 ± 1 kHz)
79	F0CNT	O	Filter f_0 control output to the CXA2523R
80	XLRF	O	Control latch output to the CXA2523R
81	CKRF	O	Control clock output to the CXA2523R
82	DTRF	O	Control data output to the CXA2523R
83	APCREF	O	Reference PWM output for the laser APC
84	LDDR	O	PWM output for the laser digital APC (Not used)
85	TRDR	O	Tracking servo drive PWM output (–)

• Abbreviation
EFM: Eight to Fourteen Modulation
PLL : Phase Locked Loop
VCO: Voltage Controlled Oscillator

Pin No.	Pin Name	I/O	Function
86	TFDR	O	Tracking servo drive PWM output (+)
87	DVDD	—	+3V power supply (Digital)
88	FFDR	O	Focus servo drive PWM output (+)
89	FRDR	O	Focus servo drive PWM output (–)
90	FS4	O	176.4 kHz clock signal output (X'tal) (Not used)
91	SRDR	O	Sled servo drive PWM output (–)
92	SFDR	O	Sled servo drive PWM output (+)
93	SPRD	O	Spindle servo drive PWM output (–)
94	SPFD	O	Spindle servo drive PWM output (+)
95	TEST0	I (S)	Test input (Fixed at "L")
96 to 98	TEST1 to TEST3	I	
99	DVSS	—	Ground (Digital)
100	EFMO	O	EFM output when recording

• Abbreviation
EFM: Eight to Fourteen Modulation

• IC307 A/D, D/A converter (CXD8607N)

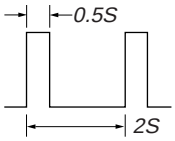
Pin No.	Pin Name	I/O	Function
1	INRP	I	Rch analog (+) input
2	INRM	I	Rch analog (–) input
3	REFI	I	A/D reference voltage input (+3.2V)
4	AV_{DD}	—	+5V power supply (A/D, analog)
5	AV_{SS}	—	Ground (A/D, analog)
6	APD	I	A/D analog block power down "L": Power down
7	NU	—	Not used
8	NU	—	
9	TEST1	I	Test pin (Fixed at "L")
10	LRCK1	I	A/D LRCK input
11	BCK1	I	A/D BCK input
12	ADDT	O	A/D data output
13	V_{35A}	—	+3.3V power supply
14	$V_{SS1\ (LF)}$	—	Ground (A/D, digital)
15	MCKI	I	A/D master clock input (256 fs)
16	DPD	I	A/D digital block power down "L": Power down/reset
17	$V_{SS2\ (LF)}$	—	Ground (D/A, digital)
18	INIT	I	D/A initialize "L": Initialize
19	MODE	I	Mode flag input
20	SHIFT	I	Shift clock input
21	LATCH	I	Latch clock input
22	256CK	O	256 fs clock output
23	V_{35D}	—	+3.3V power supply
24	V_{SS2}	—	Ground (D/A, digital)
25	512CK	O	512 fs clock output
26	BCK2	I	D/A BCK input
27	DADT	I	D/A data input
28	LRCK2	I	D/A LRCK input
29	V_{DD2}	—	+5V power supply (D/A, digital)
30	R1	O	Rch PLM output 1
31	AV_{DDR}	—	+5V power supply (D/A, Rch, analog)
32	R2	O	Rch PLM output 2
33	AV_{SSR}	—	Ground (D/A, Rch, analog)
34	XV_{DD}	—	+5V power supply (X'tal)
35	XOUT	O	X'tal oscillation output (22 MHz)
36	XIN	I	X'tal oscillation input (512 fs) (22 MHz)
37	XV_{SS}	—	Ground (X'tal)
38	AV_{SSL}	—	Ground (D/A, Lch, analog)
39	L2	O	Lch PLM output 2
40	AV_{DDL}	—	+5V power supply (D/A, Lch, analog)

Pin No.	Pin Name	I/O	Function
41	L1	O	Lch PLM output 1
42	V_{DD2}	—	+5V power supply (D/A, digital)
43	V_{DD1}	—	+5V power supply (A/D, digital)
44	V_{DD1}	—	
45	V_{SS1}	—	Ground (A/D, digital)
46	TEST2	I	Test pin (Fixed at “L”)
47	TEST3	I	
48	V_{SS1} (LF)	—	Ground (A/D, digital)
49	NU	—	Not used
50	NU	—	
51	AV_{SS} (LF)	—	Ground (A/D, analog)
52	LV_{DD}	—	+5V power supply (A/D, buffer)
53	LV_{SS}	—	Ground (A/D, buffer)
54	REFO	O	A/D reference voltage output (+3.2V)
55	INLM	I	Lch analog (–) input
56	INLP	I	Lch analog (+) input

• IC316 System Control (RU8X11AMF-0109/RU8X11AMF-0115)

Pin No.	Pin Name	I/O	Function
1	DAOUT 0	O	Test pin. C1 is output when test mode (Not used)
2	DAOUT 1	O	Test pin. ADER is output when test mode (Not used)
3 to 5	KEY 0 to KEY 2	I	Key input pin (D/A input)
6	CHUCK IN	I	Detection input from the chucking-in switch "L": Chucking
7	PACK IN	I	Detection input from the disc detection switch
8	PACK OUT	I	Detection input from the loading out switch. Loaded out position: "L", Others: "H"
9	TIMER SW	I	Key input pin (D/A input)
10	SOURCE SW	I	
11	(AVSS)	—	Ground (Analog)
12	XINT	I	Interrupt status input from the CXD2650R or CXD2652AR
13	POWER DOWN	I	POWER DOWN signal input "L": Down
14	REMOCON	I	Remote control signal interrupt input
15	SQSY	I	ATP address sync or subcode Q sync (SCOR) input from the CXD2650R or CXD2652AR "L" is input every 13.3 msec Almost all, "H"
16	DQSY	I	Digital-In U-bit CD format subcode Q sync (SCOR) input from the CXD2650R or CXD2652AR "L" is input every 13.3 msec Almost all, "H"
17	—	—	Not used
18	—	—	Not used
19	—	—	
20	SYSTEM-RST	I	System reset signal input For several hundreds msec after the power supply rises, "L" is input, then it changes to"H"
21	(TEST)	I	Test pin (Fixed at "L")
22	+3.3V	—	+3.3V power supply
23	VBAT	—	Power supply pin to RTC (clock) and RAM
24	XOUT-T	O	Clock output (32.768 kHz) (For clock)
25	XIN-T	I	Clock input (32.768 kHz) (For clock)
26	GND	—	Ground
27	XOUT	O	Main clock output (12 MHz)
28	XIN	I	Main clock input (12 MHz)
29	GND	—	Ground
30	(S1)	—	Not used
31	—	—	
32	SENS	I	Internal status (SENSE) input from the CXD2650R or CXD2652AR
33	SHOCK	I	Track jump signal input from the CXD2650R or CXD2652AR
34	$\overline{\text{REC}}$/OTHER	I	BEEP sound output switching signal input (Not used)
35	—	I	Not used
36	STB	O	Strobe signal output to the power supply circuit Power supply ON: "H", stand by: "L"
37	REC P	I	Detection signal input from the recording position detection switch
38	PLAY P	I	Detection signal input from the playback position detection switch
39	LOAD V	O	Loading motor voltage control output
40	—	O	Not used

Pin No.	Pin Name	I/O	Function
41	MNT2	I	Monitor 2 input from the CXD2650R or CXD2652AR
42	MNT3	I	Monitor 3 input from the CXD2650R or CXD2652AR
43	LED0	O	Drive output to the POWER ON/STANDBY display LED
44	—	—	Not used
45	—	—	Not used
46	BUS OUT	O	Not used
47	GND	—	Ground
48	+3.3V	—	+3.3V power supply
49	BEEP SW	I	Input from the BEEP sound output ON/OFF switch
50, 51	JOG 1, JOG 0	I	JOG dial pulse input from the rotary encoder
52	SDA	I/O	Data signal input/output pin with the backup memory
53	SCL	O	Clock signal output to the backup memory
54	—	—	Not used
55	—	—	
56	—	—	
57	—	—	
58	—	—	
59	AUBK	I	Not used
60	SA/SW	O	Audio bus/remote control switching signal output (Not used)
61	—	—	Not used
62	—	—	
63	CLKSET0	I	Clock destination select pin (Fixed at “L”)
64	CLKSET1	I	
65	GND	—	Ground
66	+3.3V	—	+3.3V power supply
67	SCLK	O	Clock signal output to the serial bus
68	SWDT	O	Writing data signal output to the serial bus
69	SRDT	I	Reading data signal input from the serial bus
70	—	—	Not used
71	FLCLK	O	Serial clock signal output to the display driver
72	FLDATA	O	Serial data signal output to the display driver
73	FLCS	O	Chip select signal output to the display driver
74	—	—	Not used
75	LDON	O	Laser ON/OFF control output “H”: Laser ON
76	PIT/GROOVE	I	Pit/groove detection input “H” is input for the playback only disc or TOC area (Not used)
77	FOK	I	FOK signal input from the CXD2650R or CXD2652AR “H” is input when focus is on
78	MODEL	I	Fixed at “L”
79	LOCK	O	Not used
80	WRPWR	O	Laser power switching signal output to the optical pick-up and CXD2650R or CXD2652AR

Pin No.	Pin Name	I/O	Function
81	DIG-RST	O	Reset signal output to the CXD2650R or CXD2652AR and motor driver Reset: "L"
82	BEEP	O	BEEP PWM output (Not used)
83	DA-RST	O	Reset signal output to the D/A, A/D converter Reset: "L"
84, 85	DSEL A, DSEL B	O	Digital input selection signal output
86	MOD	O	Laser modulation switching signal output Playback power: "L", stop: "H" Recording power: 
87	—	—	Not used
88	—	—	
89	SCTX	O	Writing data transmission timing output to the CXD2650R or CXD2652AR Shared with the magnetic head ON/OFF output
90	XLATCH	O	Latch signal output to the serial bus
91	—	—	Not used
92	—	—	Not used
93	AMUTE	O	Line out muting output
94	LOAD OUT	O	Loading motor control output *1
95	LOAD IN	O	
96	LIMITIN	I	Detection input from the limit switch Sled limit-In: "L"
97	PROTECT	I	Recording-protection claw detection input from the protection detection switch Protect: "H"
98	REFLECT	I	Disk reflection rate detection input from the reflect detection switch Disk with low reflection rate: "H"
99	GND	—	Ground
100	+3.3V	—	+3.3V power supply

*1 Loading motor control

Operation / Pin	IN	OUT	Brake
LOAD IN 95 pin	"H"	"L"	"H"
LOAD OUT 94 pin	"L"	"H"	"H"

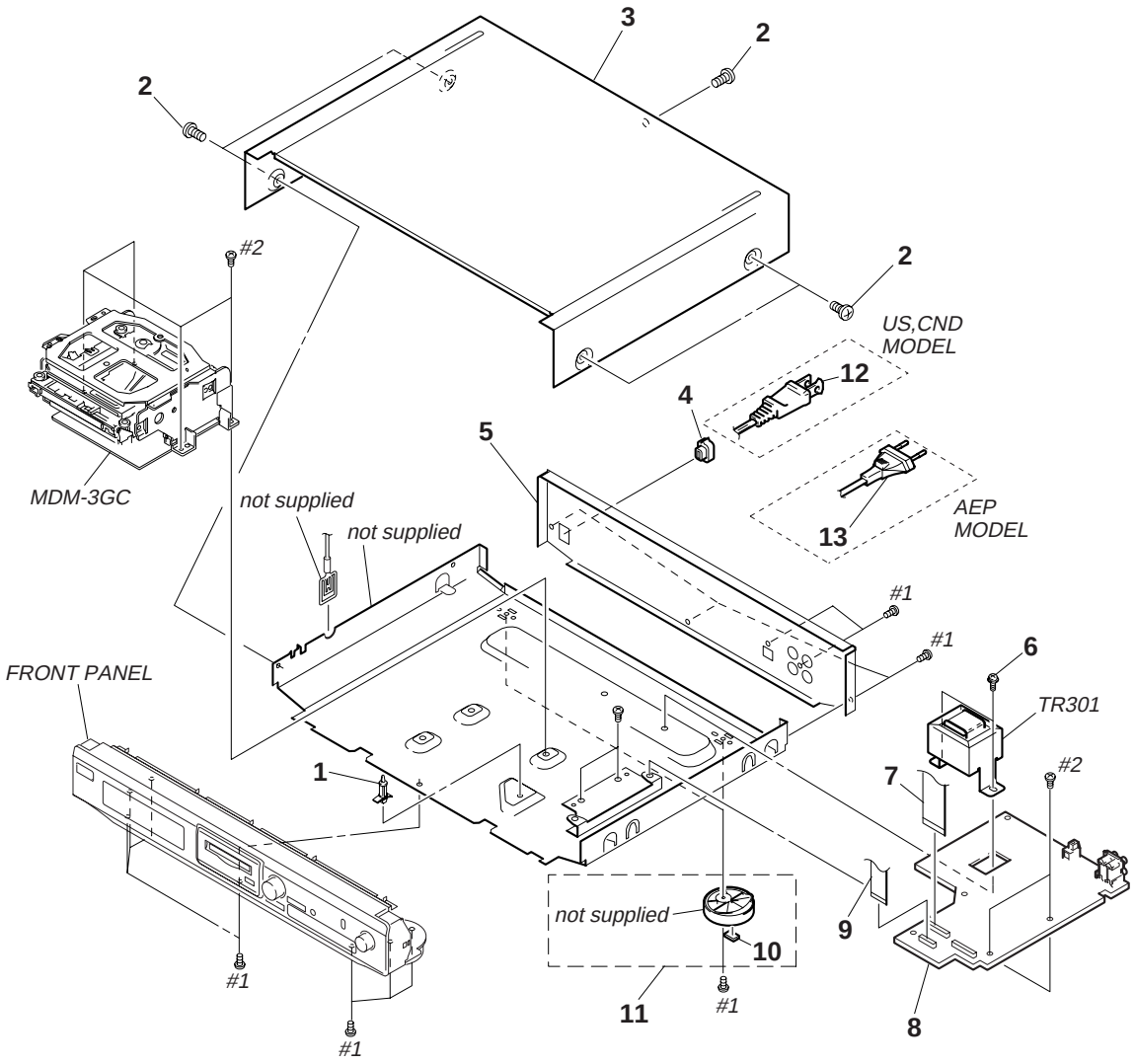
SECTION 7
EXPLODED VIEWS

NOTE:
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Color Indication of Appearance Parts Example:
  KNOB, BALANCE (WHITE)
  ↑
  Cabinets color
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  CND : Canadian model

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

7-1. MAIN SECTION



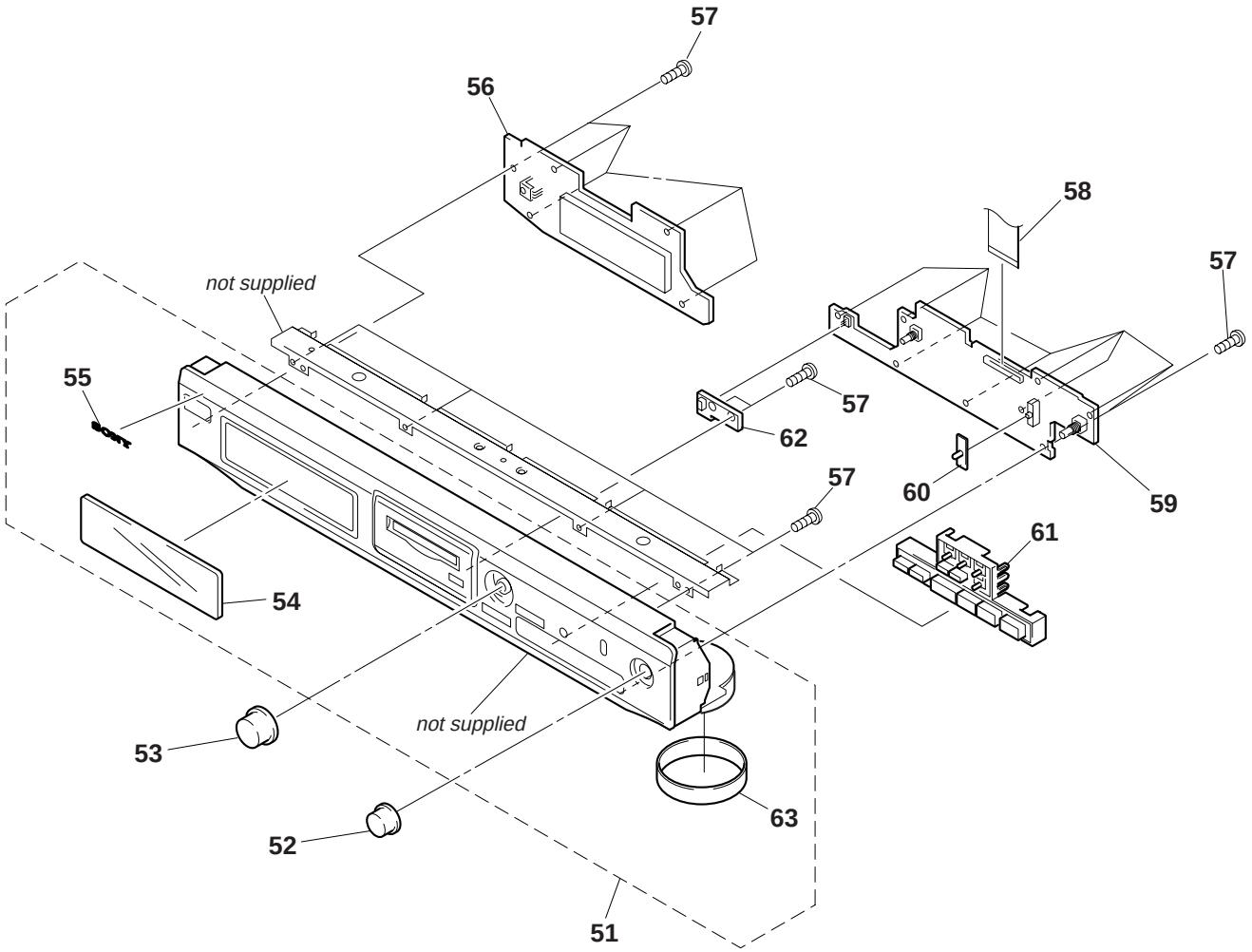
Ref. No.	Part No.	Description	Remark
* 1	3-703-353-05	SUPPORT, PC BOARD	
2	4-210-291-01	SCREW (CASE 3 TP2)	
3	4-983-661-01	CASE (408226)	
4	3-703-571-11	BUSHING (S) (4516), CORD	
* 5	4-990-651-11	PANEL, BACK (US)	
* 5	4-990-651-41	PANEL, BACK (CND)	
* 5	4-990-651-51	PANEL, BACK (AEP)	
6	4-886-821-11	SCREW, S TIGHT, +PTTWH 3X6	
7	1-777-275-11	WIRE (FLAT TYPE) (29 CORE)	
* 8	A-4724-249-A	MAIN BOARD, COMPLETE (US,CND)	

Ref. No.	Part No.	Description	Remark
* 8	A-4724-278-A	MAIN BOARD, COMPLETE (AEP)	
9	1-777-278-11	WIRE (FLAT TYPE) (19 CORE)	
10	4-977-358-11	CUSHION	
11	X-4947-207-1	FOOT ASSY (F50150S) (AEP)	
11	X-4947-208-1	FOOT ASSY (F50150S) (US,CND)	
⚠12	1-558-945-21	CORD, POWER (POLAR.SPT-1)(US,CND)	
⚠13	1-575-651-91	CORD, POWER (AEP)	
⚠TR301	1-429-735-11	TRANSFORMER, POWER (US,CND)	
⚠TR301	1-431-426-21	TRANSFORMER, POWER (AEP)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

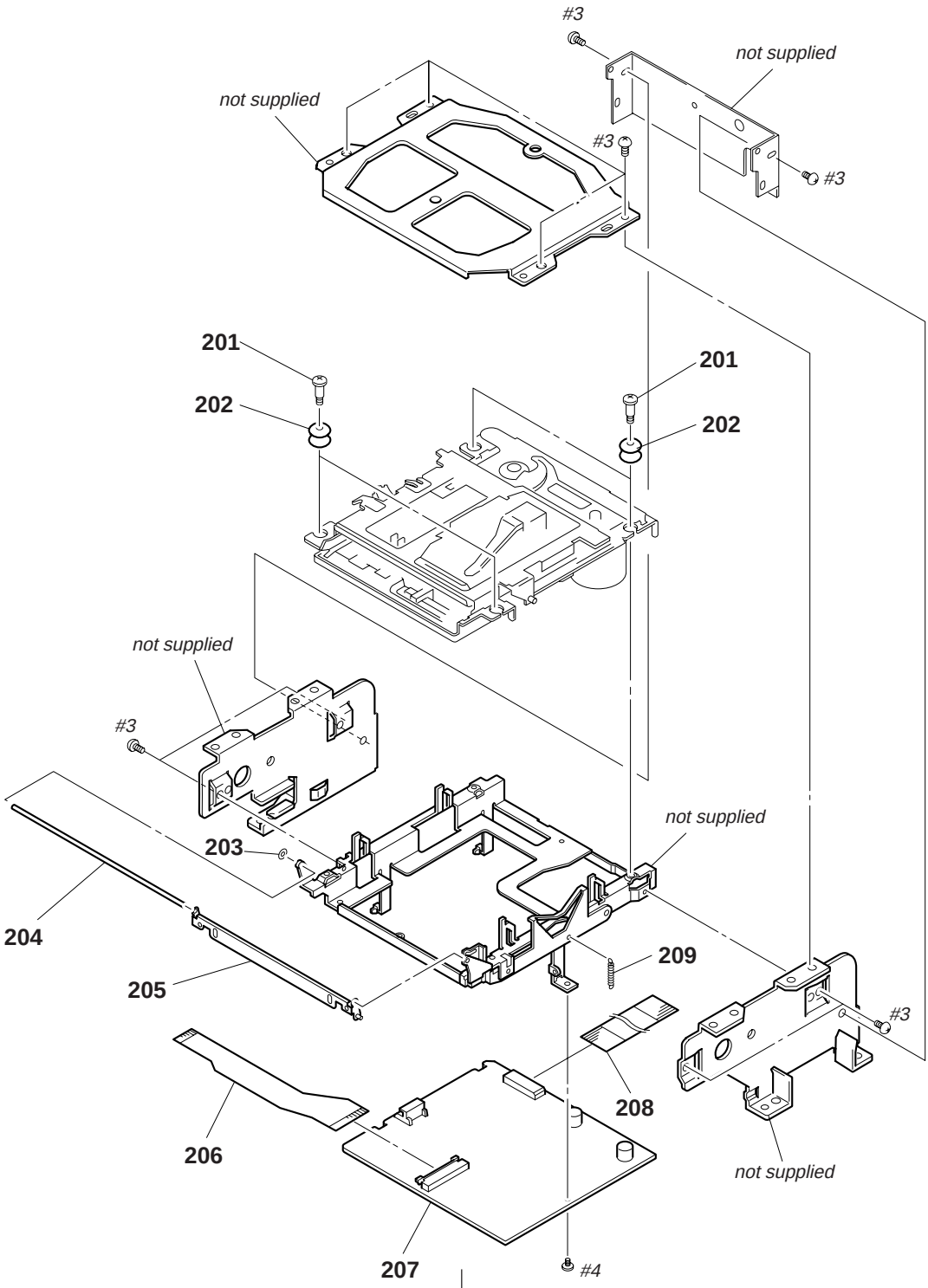
7-2. FRONT PANEL SECTION



Ref. No.	Part No.	Description	Remark
51	X-4949-987-1	PANEL ASSY, FRONT (US,CND)	
51	X-4950-355-1	PANEL ASSY, FRONT (AEP)	
52	4-983-656-01	KNOB (REC)	
53	4-983-657-01	KNOB (AMS)	
54	4-983-651-01	WINDOW (DISPLAY)	
55	4-963-404-21	EMBLEM (5-A), SONY	
* 56	A-4724-246-A	DISPLAY BOARD, COMPLETE (US,CND)	
* 56	A-4724-275-A	DISPLAY BOARD, COMPLETE (AEP)	
57	4-951-620-01	SCREW (2.6X8), +BVTP	
58	1-777-276-11	WIRE (FLAT TYPE) (29 CORE)	

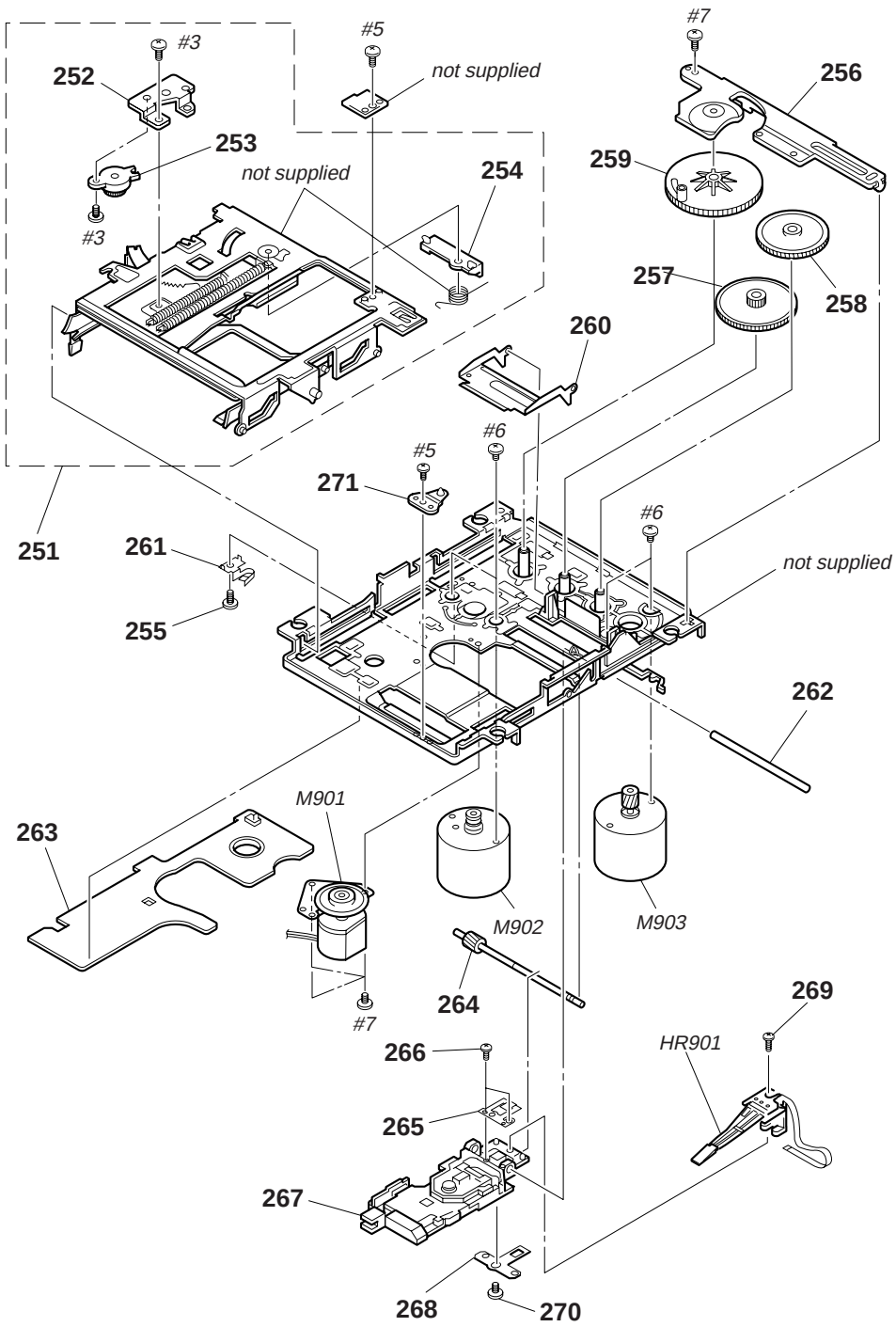
Ref. No.	Part No.	Description	Remark
* 59	A-4724-247-A	SW BOARD, COMPLETE (US,CND)	
* 59	A-4724-276-A	SW BOARD, COMPLETE (AEP)	
60	3-917-216-21	KNOB (TIMER)	
61	4-983-653-41	BUTTON (MAIN)	
* 62	1-661-893-11	EJECT SW BOARD	
63	4-977-593-11	RING (DIA. 50), ORNAMENTAL (AEP)	

7-3. MECHANISM DECK SECTION (1) (MDM-3GC)



Ref. No.	Part No.	Description	Remark
201	4-628-167-01	SCREW, STEP	
202	4-987-327-01	INSULATOR	
203	4-986-959-11	WASHER (STOPPER)	
204	4-997-456-11	SHAFT (SHUTTER A)	
205	X-4950-252-1	SHUTTER ASSY	
206	1-660-966-11	PC BOARD, OP RALAY FLEXIBLE	
207	A-4699-770-A	BD BOARD, COMPLETE	
208	1-777-517-11	WIRE (FLAT TYPE) (15 CORE)	
209	4-987-910-01	SPRING (O/C), TENSION	

7-4. MECHANISM DECK SECTION (2) (MDM-3GC)



Ref. No.	Part No.	Description	Remark
251	A-4672-138-A	SLIDER ASSY BOARD, COMPLETE	
* 252	4-983-439-01	BRACKET (DAMPER)	
253	3-953-235-01	DAMPER, OIL	
254	4-983-437-01	SLIDER (CAM)	
255	3-342-375-11	SCREW (M1.7X1.4), SPECIAL	
* 256	4-979-890-11	RETAINER (GEAR)	
257	4-979-898-01	GEAR (LB)	
258	4-979-899-01	GEAR (LC)	
259	4-979-897-01	GEAR (LA)	
260	4-979-885-01	LEVER (HEAD UP)	
261	4-979-906-11	SPRING (LEAD SCREW)	
* 262	4-984-556-01	SHAFT (MAIN SHAFT)	
* 263	1-661-774-11	SW BOARD	
264	A-3304-200-A	SCREW ASSY, LEAD	
* 265	4-963-914-02	RACK (INSERTER)	

Ref. No.	Part No.	Description	Remark
266	3-366-890-11	SCREW (M1.4)	
⚠ 267	8-583-028-02	OPTICAL PICK-UP KMS-260A/J1NP	
268	4-987-061-01	SPACER (RACK)	
269	4-988-560-01	SCREW (+P1.7X6)	
270	4-955-841-11	SCREW	
* 271	4-983-511-02	PIN (OUTSERT)	
HP901	1-500-396-11	HEAD, OVER WRITE	
M901	A-4672-135-A	MOTOR ASSY, SPINDLE	
M902	A-4672-133-A	MOTOR ASSY, SLED	
M903	A-4672-134-A	MOTOR ASSY, LOADING	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

SECTION 8
ELECTRICAL PARTS LIST

Note:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: µ , for example:
  uA...: µ A..., uPA...: µ PA..., uPB...: µ PB..., uPC...: µ PC..., uPD...: µ PD...
- CAPACITORS
  uF : µ F
- COILS
  uH : µ H
- Abbreviation
  CND : Canadian model

Ref. No.	Part No.	Description			Remark
	A-4699-770-A	BD BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C102	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C103	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C104	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C105	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C106	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C107	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C108	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C109	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C110	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C111	1-164-344-11	CERAMIC CHIP	0.068uF	10%	25V
C112	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C113	1-107-682-11	CERAMIC CHIP	1uF	10%	16V
C115	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C116	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C117	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C119	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C121	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C122	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C123	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C124	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C127	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C128	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C129	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C130	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C131	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V
C132	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C133	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C134	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C135	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C136	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C141	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C142	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C143	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C144	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C146	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C151	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C152	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C153	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C156	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C158	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
C160	1-104-601-11	ELECT CHIP	10uF	20%	10V
C161	1-104-601-11	ELECT CHIP	10uF	20%	10V
C163	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C164	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C167	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C168	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C169	1-104-851-11	TANTAL. CHIP	10uF	20%	10V
C171	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C181	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C182	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C183	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C184	1-107-836-11	ELECT CHIP	22uF	20%	8V
C185	1-164-611-11	CERAMIC CHIP	0.001uF	10%	500V
C187	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C188	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C189	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C190	1-126-206-11	ELECT CHIP	100uF	20%	6.3V
C191	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C195	1-164-346-11	CERAMIC CHIP	1uF		16V
C196	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C197	1-163-038-91	CERAMIC CHIP	0.1uF		25V
		< CONNECTOR >			
CN101	1-766-508-11	CONNECTOR, FFC/FPC (ZIF) 22P			
CN102	1-778-461-11	CONNECTOR, FFC/FPC 29P			
CN103	1-778-460-11	CONNECTOR, FFC/FPC 19P			
CN104	1-766-898-21	HOUSING, CONNECTOR(PC BOARD)4P			
CN106	1-770-698-11	CONNECTOR, FFC/FPC 15P			
CN110	1-774-731-21	PIN, CONNECTOR (PC BOARD) 5P			
		< DIODE >			
D101	8-719-988-62	DIODE 1SS355			
D181	8-719-046-86	DIODE F1J6TP			
D183	8-719-046-86	DIODE F1J6TP			
		< IC >			
IC101	8-752-074-77	IC CXA2523R			
IC103	8-729-903-10	IC TRANSISTOR FMW1			
IC121	8-752-384-47	IC CXD2652AR			
IC122	8-759-234-20	IC TC7S08F			
IC123	8-759-242-70	IC TC7WU04F			

BD

Ref. No.	Part No.	Description	Remarks
IC124	8-759-473-29	IC MN41V4400SJ-08-T1	
IC152	8-759-430-25	IC BH6511FS-E2	
IC171	8-759-484-73	IC BR24C01AF-E2	
IC181	8-759-095-65	IC TC74ACT540FS	
IC192	8-759-426-95	IC L88MS33T-TL	
		< COIL >	
L101	1-414-235-11	INDUCTOR CHIP 0uH	
L102	1-414-235-11	INDUCTOR CHIP 0uH	
L103	1-414-235-11	INDUCTOR CHIP 0uH	
L105	1-414-235-11	INDUCTOR CHIP 0uH	
L106	1-414-235-11	INDUCTOR CHIP 0uH	
L121	1-414-235-11	INDUCTOR CHIP 0uH	
L122	1-414-235-11	INDUCTOR CHIP 0uH	
L151	1-412-622-51	INDUCTOR 10uH	
L152	1-412-622-51	INDUCTOR 10uH	
L153	1-412-039-51	INDUCTOR CHIP 100uH	
L154	1-412-039-51	INDUCTOR CHIP 100uH	
L161	1-414-235-11	INDUCTOR CHIP 0uH	
L162	1-414-235-11	INDUCTOR CHIP 0uH	
		< TRANSISTOR >	
Q101	8-729-403-35	TRANSISTOR UN5113	
Q102	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q103	8-729-028-99	TRANSISTOR RN1307-TE85L	
Q104	8-729-028-99	TRANSISTOR RN1307-TE85L	
Q162	8-729-101-07	TRANSISTOR 2SB798-DL	
Q163	8-729-403-35	TRANSISTOR UN5113	
Q180	8-729-029-09	TRANSISTOR RN1301-TE85L	
Q181	8-729-018-75	TRANSISTOR 2SJ278MY	
Q182	8-729-017-65	TRANSISTOR 2SK1764KY	
		< RESISTOR >	
R101	1-216-295-91	SHORT 0	
R103	1-216-049-91	RES,CHIP 1K 5%	1/10W
R104	1-216-073-00	METAL CHIP 10K 5%	1/10W
R105	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
R106	1-216-133-00	METAL CHIP 3.3M 5%	1/10W
R107	1-216-113-00	METAL CHIP 470K 5%	1/10W
R109	1-216-295-91	SHORT 0	
R110	1-216-073-00	METAL CHIP 10K 5%	1/10W
R111	1-216-295-91	SHORT 0	
R112	1-216-089-91	RES,CHIP 47K 5%	1/10W
R113	1-216-049-91	RES,CHIP 1K 5%	1/10W
R115	1-216-049-91	RES,CHIP 1K 5%	1/10W
R117	1-216-113-00	METAL CHIP 470K 5%	1/10W
R120	1-216-025-91	RES,CHIP 100 5%	1/10W
R121	1-216-097-91	RES,CHIP 100K 5%	1/10W
R123	1-216-033-00	METAL CHIP 220 5%	1/10W
R124	1-216-025-91	RES,CHIP 100 5%	1/10W
R125	1-216-025-91	RES,CHIP 100 5%	1/10W
R127	1-216-025-91	RES,CHIP 100 5%	1/10W
R131	1-216-073-00	METAL CHIP 10K 5%	1/10W
R132	1-216-097-91	RES,CHIP 100K 5%	1/10W
R133	1-216-117-00	METAL CHIP 680K 5%	1/10W
R134	1-216-049-91	RES,CHIP 1K 5%	1/10W
R135	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R136	1-216-049-91	RES,CHIP 1K 5%	1/10W

Ref. No.	Part No.	Description	Remarks
R137	1-216-025-91	RES,CHIP 100 5%	1/10W
R140	1-216-029-00	METAL CHIP 150 5%	1/10W
R141	1-216-295-91	SHORT 0	
R142	1-216-073-00	METAL CHIP 10K 5%	1/10W
R143	1-216-073-00	METAL CHIP 10K 5%	1/10W
R144	1-216-025-91	RES,CHIP 100 5%	1/10W
R146	1-216-037-00	METAL CHIP 330 5%	1/10W
R147	1-216-025-91	RES,CHIP 100 5%	1/10W
R148	1-216-045-00	METAL CHIP 680 5%	1/10W
R150	1-216-295-91	SHORT 0	
R158	1-216-097-91	RES,CHIP 100K 5%	1/10W
R159	1-216-097-91	RES,CHIP 100K 5%	1/10W
R161	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R162	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R163	1-216-057-00	METAL CHIP 2.2K 5%	1/10W
R164	1-216-045-00	METAL CHIP 680 5%	1/10W
R165	1-216-097-91	RES,CHIP 100K 5%	1/10W
R166	1-220-149-11	REGISTER 2.2 10%	1/2W
R167	1-216-065-91	RES,CHIP 4.7K 5%	1/10W
R169	1-219-724-11	METAL CHIP 1 1%	1/4W
R170	1-216-073-00	METAL CHIP 10K 5%	1/10W
R171	1-216-073-00	METAL CHIP 10K 5%	1/10W
R172	1-216-295-91	SHORT 0	
R173	1-216-121-91	RES,CHIP 1M 5%	1/10W
R175	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R176	1-216-295-91	SHORT 0	
R177	1-216-061-00	METAL CHIP 3.3K 5%	1/10W
R178	1-216-295-91	SHORT 0	
R179	1-216-089-91	RES,CHIP 47K 5%	1/10W
R180	1-216-073-00	METAL CHIP 10K 5%	1/10W
R181	1-216-073-00	METAL CHIP 10K 5%	1/10W
R182	1-216-089-91	RES,CHIP 47K 5%	1/10W
R183	1-216-089-91	RES,CHIP 47K 5%	1/10W
R184	1-216-073-00	METAL CHIP 10K 5%	1/10W
R185	1-216-073-00	METAL CHIP 10K 5%	1/10W
R186	1-216-296-91	SHORT 0	
R187	1-216-296-91	SHORT 0	
R188	1-216-073-00	METAL CHIP 10K 5%	1/10W
R189	1-216-073-00	METAL CHIP 10K 5%	1/10W
R190	1-216-073-00	METAL CHIP 10K 5%	1/10W
R195	1-216-295-91	SHORT 0	
R196	1-216-295-91	SHORT 0	
R198	1-216-295-91	SHORT 0	
R199	1-216-295-91	SHORT 0	
R200	1-216-295-91	SHORT 0	
R201	1-216-295-91	SHORT 0	
R202	1-216-295-91	SHORT 0	
R502	1-216-295-91	SHORT 0	
R504	1-216-295-91	SHORT 0	

****

Ref. No.	Part No.	Description				Remarks
*	A-4724-247-A	CONTROL(SW) BOARD, COMPLETE (US,CND)				
		**********				
*	A-4724-276-A	CONTROL(SW) BOARD, COMPLETE (AEP)				
		**********				
		< CAPACITOR >				
C701	1-164-159-11	CERAMIC	0.1uF		50V	
C709	1-126-153-11	ELECT	22uF	20%	6.3V	
		< CONNECTOR >				
CN701	1-778-324-11	CONNECTOR, FFC/FPC 29P				
CN704	1-766-805-11	CONNECTOR, BOARD TO BOARD 3P				
CN706	1-778-317-11	CONNECTOR, BOARD TO BOARD 13P				
		< RESISTOR >				
R707	1-249-429-11	CARBON	10K	5%	1/4W	
R708	1-249-429-11	CARBON	10K	5%	1/4W	
R709	1-249-429-11	CARBON	10K	5%	1/4W	
R752	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R753	1-247-843-11	CARBON	3.3K	5%	1/4W	
R754	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R755	1-249-429-11	CARBON	10K	5%	1/4W	
R756	1-249-435-11	CARBON	33K	5%	1/4W	
R763	1-247-843-11	CARBON	3.3K	5%	1/4W	
R764	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R772	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R773	1-247-843-11	CARBON	3.3K	5%	1/4W	
R774	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R775	1-249-429-11	CARBON	10K	5%	1/4W	
R776	1-249-435-11	CARBON	33K	5%	1/4W	
R777	1-249-429-11	CARBON	10K	5%	1/4W	
R780	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R781	1-247-843-11	CARBON	3.3K	5%	1/4W	
R782	1-249-425-11	CARBON	4.7K	5%	1/4W	F
R783	1-249-429-11	CARBON	10K	5%	1/4W	
R784	1-249-421-11	CARBON	2.2K	5%	1/4W	F
R784	1-249-429-11	CARBON	10K	5%	1/4W	
		< VARIABLE RESISTOR >				
RV701	1-223-762-11	RES, VAR, CARBON 20K/20K (REC LEVEL)				
		< SWITCH >				
S701	1-473-779-11	ENCODER, ROTARY (AMS(PUSH ENTER))				
S702	1-572-624-11	SWITCH, SLIDE (INPUT)				
S703	1-572-624-11	SWITCH, SLIDE				
S751	1-554-303-21	SWITCH, TACTILE (NO/EDIT)				
S752	1-554-303-21	SWITCH, TACTILE (YES)				
S762	1-554-303-21	SWITCH, TACTILE (DISPLAY/CHAR)				
S771	1-554-303-21	SWITCH, TACTILE (REC)				
S772	1-554-303-21	SWITCH, TACTILE (STOP)				
S774	1-554-303-21	SWITCH, TACTILE (FF)				
S775	1-554-303-21	SWITCH, TACTILE (REW)				
S780	1-554-303-21	SWITCH, TACTILE (PAUSE)				
S781	1-554-303-21	SWITCH, TACTILE (PLAY)				

****

Ref. No.	Part No.	Description				Remarks
*	A-4724-246-A	DISPLAY BOARD, COMPLETE (US,CND)				
		**********				
*	A-4724-275-A	DISPLAY BOARD, COMPLETE (AEP)				
		**********				
	2-389-320-01	CUSHION				
*	4-983-462-01	HOLDER (FL)				
		< CAPACITOR >				
C700	1-164-159-11	CERAMIC	0.1uF		50V	
C705	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C706	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C707	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C708	1-162-306-11	CERAMIC	0.01uF	20%	16V	
C710	1-162-215-31	CERAMIC	47PF	5%	50V	
C717	1-128-057-11	ELECT	330uF	20%	6.3V	
C718	1-162-306-11	CERAMIC	0.01uF	20%	16V	
C721	1-162-306-11	CERAMIC	0.01uF	20%	16V	
		< CONNECTOR >				
CN707	1-778-318-11	CONNECTOR, BOARD TO BOARD 13P				
		< DIODE >				
D701	8-719-313-40	DIODE SEL1516W				
		< FILTER >				
FL701	1-517-575-11	INDICATOR TUBE, FLUORESCENT				
		< IC >				
IC701	8-759-426-98	IC MSM9202-02GS-K				
IC702	8-749-012-71	IC GP1UC7XB				
		< TRANSISTOR >				
Q701	8-729-422-57	TRANSISTOR UN4111				
Q702	8-729-900-74	TRANSISTOR DTC143TS				
		< RESISTOR >				
R701	1-249-429-11	CARBON	10K	5%	1/4W	
R705	1-247-842-11	CARBON	3K	5%	1/4W	
R711	1-249-399-11	CARBON	33	5%	1/4W	F
R712	1-249-409-11	CARBON	220	5%	1/4W	F
R721	1-247-807-31	CARBON	100	5%	1/4W	
R722	1-247-807-31	CARBON	100	5%	1/4W	
R723	1-247-807-31	CARBON	100	5%	1/4W	
R724	1-247-807-31	CARBON	100	5%	1/4W	
R741	1-249-401-11	CARBON	47	5%	1/4W	F
R791	1-247-807-31	CARBON	100	5%	1/4W	
		< SWITCH >				
S764	1-554-303-21	SWITCH, TACTILE (POWER)				

****

EJECT SW | MAIN

Ref. No.	Part No.	Description			Remarks
*	1-661-893-11	EJECT SW BOARD			
		**********			
		< CONNECTOR >			
CN705	1-766-806-11	HOUSING, CONNECTOR 3P			
		< SWITCH >			
S776	1-554-303-21	SWITCH, TACTILE (EJECT)			
**********					
*	A-4724-249-A	MAIN BOARD, COMPLETE (US,CND)			
		**********			
*	A-4724-278-A	MAIN BOARD, COMPLETE (AEP)			
		**********			
	1-762-764-11	SWITCH, POWER			
	7-685-872-09	SCREW +BVTT 3X8 (S)			
		< BATTERY >			
BT301	1-528-739-11	BATTERY, LITHIUM (SECONDARY)			
		< CAPACITOR >			
C101	1-136-356-11	FILM	470PF	5%	50V
C102	1-128-551-11	ELECT	22uF	20%	25V
C103	1-126-964-11	ELECT	10uF	20%	50V
C104	1-137-368-11	FILM	0.0047uF	5%	50V
C105	1-137-368-11	FILM	0.0047uF	5%	50V
C106	1-102-978-00	CERAMIC	220PF	5%	50V
C107	1-102-973-00	CERAMIC	100PF	5%	50V
C108	1-102-973-00	CERAMIC	100PF	5%	50V
C109	1-104-665-11	ELECT	100uF	20%	10V
C110	1-137-368-11	FILM	0.0047uF	5%	50V
C111	1-137-364-11	FILM	0.001uF	5%	50V
C112	1-128-551-11	ELECT	22uF	20%	25V
C113	1-136-356-11	FILM	470PF	5%	50V
C201	1-136-356-11	FILM	470PF	5%	50V
C202	1-128-551-11	ELECT	22uF	20%	25V
C203	1-126-964-11	ELECT	10uF	20%	50V
C204	1-137-368-11	FILM	0.0047uF	5%	50V
C205	1-137-368-11	FILM	0.0047uF	5%	50V
C206	1-102-978-00	CERAMIC	220PF	5%	50V
C207	1-102-973-00	CERAMIC	100PF	5%	50V
C208	1-102-973-00	CERAMIC	100PF	5%	50V
C209	1-104-665-11	ELECT	100uF	20%	10V
C210	1-137-368-11	FILM	0.0047uF	5%	50V
C211	1-137-364-11	FILM	0.001uF	5%	50V
C212	1-128-551-11	ELECT	22uF	20%	25V
C213	1-136-356-11	FILM	470PF	5%	50V
C302	1-104-665-11	ELECT	100uF	20%	10V
C303	1-126-934-11	ELECT	220uF	20%	10V
C304	1-126-934-11	ELECT	220uF	20%	10V
C306	1-162-207-31	CERAMIC	22PF	5%	50V
C307	1-162-203-31	CERAMIC	15PF	5%	50V
C309	1-164-159-11	CERAMIC	0.1uF		50V
C310	1-104-665-11	ELECT	100uF	20%	10V
C311	1-126-934-11	ELECT	220uF	20%	10V
C312	1-164-159-11	CERAMIC	0.1uF		50V

Ref. No.	Part No.	Description			Remarks
C313	1-164-159-11	CERAMIC	0.1uF		50V
C314	1-126-926-11	ELECT	1000uF	20%	10V
C315	1-164-159-11	CERAMIC	0.1uF		50V
C316	1-126-934-11	ELECT	220uF	20%	10V
C317	1-164-159-11	CERAMIC	0.1uF		50V
C318	1-126-934-11	ELECT	220uF	20%	10V
C319	1-126-934-11	ELECT	220uF	20%	10V
C322	1-117-850-11	ELECT	15000uF	20%	16V
C323	1-126-040-11	ELECT	1000uF	20%	35V
C324	1-126-964-11	ELECT	10uF	20%	50V
C326	1-126-963-11	ELECT	4.7uF	20%	50V
C327	1-126-916-11	ELECT	1000uF	20%	6.3V
C328	1-126-916-11	ELECT	1000uF	20%	6.3V
C329	1-113-920-11	CERAMIC	0.0022uF	20%	250V
C331	1-113-920-11	CERAMIC	0.0022uF	20%	250V
C332	1-128-576-11	ELECT	100uF	20%	63V
C333	1-126-950-11	ELECT	330uF	20%	35V
C334	1-164-159-11	CERAMIC	0.1uF		50V
C335	1-126-040-11	ELECT	1000uF	20%	35V
C336	1-162-306-11	CERAMIC	0.01uF	20%	16V
C340	1-164-159-11	CERAMIC	0.1uF		50V
C341	1-164-159-11	CERAMIC	0.1uF		50V
C344	1-162-306-11	CERAMIC	0.01uF	20%	16V
C347	1-164-159-11	CERAMIC	0.1uF		50V
C350	1-162-306-11	CERAMIC	0.01uF	20%	16V
C351	1-162-306-11	CERAMIC	0.01uF	20%	16V
C352	1-162-294-31	CERAMIC	0.001uF	10%	50V
C353	1-162-306-11	CERAMIC	0.01uF	20%	16V
C354	1-164-159-11	CERAMIC	0.1uF		50V
C355	1-162-282-31	CERAMIC	100PF	10%	50V
C356	1-162-282-31	CERAMIC	100PF	10%	50V
C357	1-162-306-11	CERAMIC	0.01uF	20%	16V
C358	1-162-306-11	CERAMIC	0.01uF	20%	16V
C359	1-162-282-31	CERAMIC	100PF	10%	50V
C360	1-162-282-31	CERAMIC	100PF	10%	50V
C361	1-162-306-11	CERAMIC	0.01uF	20%	16V
C365	1-128-551-11	ELECT	22uF	20%	25V
C370	1-126-962-11	ELECT	3.3uF	20%	50V
C372	1-164-159-11	CERAMIC	0.1uF		50V
C373	1-162-306-11	CERAMIC	0.01uF	20%	16V
C374	1-162-306-11	CERAMIC	0.01uF	20%	16V
C375	1-162-306-11	CERAMIC	0.01uF	20%	16V
C376	1-162-306-11	CERAMIC	0.01uF	20%	16V
C378	1-162-306-11	CERAMIC	0.01uF	20%	16V
C401	1-162-203-31	CERAMIC	15PF	5%	50V
C402	1-162-203-31	CERAMIC	15PF	5%	50V
		< CONNECTOR >			
CN301	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P			
CN303	1-770-657-11	CONNECTOR, FFC/FPC 29P			
CN304	1-770-657-11	CONNECTOR, FFC/FPC 29P			
CN305	1-770-167-11	CONNECTOR, FFC/FPC 19P			
		< DIODE >			
D301	8-719-911-19	DIODE 1SS119			
D302	8-719-911-19	DIODE 1SS119			
D303	8-719-024-99	DIODE 11ES2-NTA2B			
D304	8-719-024-99	DIODE 11ES2-NTA2B			
D305	8-719-024-99	DIODE 11ES2-NTA2B			

Ref. No.	Part No.	Description	Remarks
D306	8-719-024-99	DIODE 11ES2-NTA2B	
D307	8-719-024-99	DIODE 11ES2-NTA2B	
D308	8-719-109-89	DIODE RD5.6ESB2	
D309	8-719-024-99	DIODE 11ES2-NTA2B	
D310	8-719-024-99	DIODE 11ES2-NTA2B	
D311	8-719-911-19	DIODE 1SS119	
D314	8-719-210-21	DIODE 11EQS04	
D315	8-719-210-21	DIODE 11EQS04	
D316	8-719-911-19	DIODE 1SS119	
		< IC >	
IC301	8-759-426-97	IC LA9615	
IC303	8-759-708-06	IC NJM78L06A	
IC304	8-759-700-69	IC NJM79L12A	
IC307	8-759-426-99	IC CXD8607N	
IC309	8-759-426-96	IC LA5620	
IC310	8-759-633-42	IC M5293L	
IC311	8-759-822-09	IC LB1641	
IC314	8-759-917-18	IC SN74HCU04AN	
IC316	8-759-476-18	IC RU8X11AMF-0115	
IC353	8-749-012-70	IC GP1F38R (DIGITAL OPTICAL IN)	
		< JACK >	
J301	1-770-720-11	JACK, PIN 4P (LINE (ANALOG))	
		< COIL >	
L305	1-410-509-11	INDUCTOR 10uH	
L310	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH	
		< LINE FILTER >	
LF301	1-424-485-11	FILTER, LINE	
		< TRANSISTOR >	
Q101	8-729-900-74	TRANSISTOR DTC143TS	
Q201	8-729-900-74	TRANSISTOR DTC143TS	
Q301	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q302	8-729-900-80	TRANSISTOR DTC114ES	
Q306	8-729-422-57	TRANSISTOR UN4111	
Q307	8-729-900-80	TRANSISTOR DTC114ES	
Q308	8-729-422-61	TRANSISTOR UN4115	
		< RESISTOR >	
R100	1-249-429-11	CARBON 10K 5% 1/4W	
R101	1-249-437-11	CARBON 47K 5% 1/4W	
R102	1-247-887-00	CARBON 220K 5% 1/4W	
R103	1-249-433-11	CARBON 22K 5% 1/4W	
R104	1-247-874-11	CARBON 62K 5% 1/4W	
R105	1-249-429-11	CARBON 10K 5% 1/4W	
R106	1-249-429-11	CARBON 10K 5% 1/4W	
R107	1-249-401-11	CARBON 47 5% 1/4W	F
R108	1-249-401-11	CARBON 47 5% 1/4W	F
R109	1-249-429-11	CARBON 10K 5% 1/4W	
R110	1-249-429-11	CARBON 10K 5% 1/4W	
R111	1-249-427-11	CARBON 6.8K 5% 1/4W	F
R112	1-249-427-11	CARBON 6.8K 5% 1/4W	F
R113	1-249-433-11	CARBON 22K 5% 1/4W	
R114	1-249-433-11	CARBON 22K 5% 1/4W	

Ref. No.	Part No.	Description	Remarks
R115	1-249-429-11	CARBON 10K 5% 1/4W	
R116	1-249-421-11	CARBON 2.2K 5% 1/4W	F
R117	1-249-417-11	CARBON 1K 5% 1/4W	F
R118	1-249-441-11	CARBON 100K 5% 1/4W	
R119	1-249-411-11	CARBON 330 5% 1/4W	
R120	1-249-415-11	CARBON 680 5% 1/4W	F
R121	1-249-429-11	CARBON 10K 5% 1/4W	
R200	1-249-429-11	CARBON 10K 5% 1/4W	
R201	1-249-437-11	CARBON 47K 5% 1/4W	
R202	1-247-887-00	CARBON 220K 5% 1/4W	
R203	1-249-433-11	CARBON 22K 5% 1/4W	
R204	1-247-874-11	CARBON 62K 5% 1/4W	
R205	1-249-429-11	CARBON 10K 5% 1/4W	
R206	1-249-429-11	CARBON 10K 5% 1/4W	
R207	1-249-401-11	CARBON 47 5% 1/4W	F
R208	1-249-401-11	CARBON 47 5% 1/4W	F
R209	1-249-429-11	CARBON 10K 5% 1/4W	
R210	1-249-429-11	CARBON 10K 5% 1/4W	
R211	1-249-427-11	CARBON 6.8K 5% 1/4W	F
R212	1-249-427-11	CARBON 6.8K 5% 1/4W	F
R213	1-249-433-11	CARBON 22K 5% 1/4W	
R214	1-249-433-11	CARBON 22K 5% 1/4W	
R215	1-249-429-11	CARBON 10K 5% 1/4W	
R216	1-249-421-11	CARBON 2.2K 5% 1/4W	F
R217	1-249-417-11	CARBON 1K 5% 1/4W	F
R218	1-249-441-11	CARBON 100K 5% 1/4W	
R219	1-249-411-11	CARBON 330 5% 1/4W	
R220	1-249-415-11	CARBON 680 5% 1/4W	F
R221	1-249-429-11	CARBON 10K 5% 1/4W	
R301	1-247-903-00	CARBON 1M 5% 1/4W	
R302	1-249-411-11	CARBON 330 5% 1/4W	
R305	1-249-429-11	CARBON 10K 5% 1/4W	
R306	1-249-429-11	CARBON 10K 5% 1/4W	
R307	1-249-401-11	CARBON 47 5% 1/4W	F
R308	1-249-417-11	CARBON 1K 5% 1/4W	F
R309	1-249-416-11	CARBON 820 5% 1/4W	F
R312	1-247-807-31	CARBON 100 5% 1/4W	
R313	1-249-417-11	CARBON 1K 5% 1/4W	F
R314	1-249-429-11	CARBON 10K 5% 1/4W	
R315	1-249-437-11	CARBON 47K 5% 1/4W	
R316	1-247-807-31	CARBON 100 5% 1/4W	
R318	1-249-429-11	CARBON 10K 5% 1/4W	
R319	1-249-429-11	CARBON 10K 5% 1/4W	
R320	1-249-429-11	CARBON 10K 5% 1/4W	
R321	1-249-429-11	CARBON 10K 5% 1/4W	
R328	1-249-429-11	CARBON 10K 5% 1/4W	
R329	1-249-429-11	CARBON 10K 5% 1/4W	
R330	1-249-429-11	CARBON 10K 5% 1/4W	
R331	1-249-429-11	CARBON 10K 5% 1/4W	
R332	1-249-429-11	CARBON 10K 5% 1/4W	
R333	1-249-429-11	CARBON 10K 5% 1/4W	
R340	1-247-895-00	CARBON 470K 5% 1/4W	
R341	1-247-804-11	CARBON 75 5% 1/4W	
R344	1-249-437-11	CARBON 47K 5% 1/4W	
R345	1-247-895-00	CARBON 470K 5% 1/4W	
R346	1-247-883-00	CARBON 150K 5% 1/4W	
R347	1-249-441-11	CARBON 100K 5% 1/4W	
R358	1-247-903-00	CARBON 1M 5% 1/4W	
R361	1-249-429-11	CARBON 10K 5% 1/4W	
R362	1-249-441-11	CARBON 100K 5% 1/4W	

Ref. No.	Part No.	Description			Remarks
R363	1-249-441-11	CARBON	100K	5%	1/4W
R366	1-249-441-11	CARBON	100K	5%	1/4W
R367	1-249-441-11	CARBON	100K	5%	1/4W
R378	1-249-441-11	CARBON	100K	5%	1/4W
R383	1-249-429-11	CARBON	10K	5%	1/4W
R384	1-249-429-11	CARBON	10K	5%	1/4W
R385	1-249-429-11	CARBON	10K	5%	1/4W
R391	1-249-429-11	CARBON	10K	5%	1/4W
R393	1-249-429-11	CARBON	10K	5%	1/4W
R395	1-249-429-11	CARBON	10K	5%	1/4W
R399	1-249-429-11	CARBON	10K	5%	1/4W
R400	1-249-429-11	CARBON	10K	5%	1/4W
R401	1-249-429-11	CARBON	10K	5%	1/4W
R402	1-249-401-11	CARBON	47	5%	1/4W F
R403	1-249-401-11	CARBON	47	5%	1/4W F
R405	1-249-429-11	CARBON	10K	5%	1/4W
R414	1-249-429-11	CARBON	10K	5%	1/4W
		< VIBRATOR >			
X301	1-579-314-11	VIBRATOR, CRYSTAL 22MHz			
X302	1-767-157-21	VIBRATOR, CERAMIC 12MHz			
X303	1-567-098-61	VIBRATOR, CRYSTAL 32.768kHz			
**********					
*	1-661-774-11	SW BOARD			
		*********			
		< CONNECTOR >			
CN601	1-770-698-11	CONNECTOR, FFC/FPC 15P			
CN602	1-778-638-21	PIN, CONNECTOR (PC BOARD) 2P			
CN603	1-778-638-21	PIN, CONNECTOR (PC BOARD) 2P			
		< SWITCH >			
S681	1-572-467-61	SWITCH, PUSH (1 KEY)(LIMIT IN)			
S682	1-692-377-31	SWITCH, PUSH (1 KEY)(REFLECT)			
S683	1-692-847-21	SWITCH, PUSH (1 KEY)(PROTECT)			
S685	1-572-467-61	SWITCH, PUSH (1 KEY)(CHUCKING IN)			
S686	1-762-621-21	SWITCH, PUSH (1 KEY)(PACK OUT)			
S687	1-572-688-11	SWITCH, PUSH (1 KEY)(PB POSITION)			
S688	1-762-621-21	SWITCH, PUSH (1 KEY)(REC POSITION)			
**********					

Ref. No.	Part No.	Description	Remarks
		MISCELLANEOUS	
		**********	
7	1-777-275-11	WIRE (FLAT TYPE) (29 CORE)	
9	1-777-278-11	WIRE (FLAT TYPE) (19 CORE)	
⚠12	1-558-945-21	CORD, POWER (POLAR.SPT-1)(US,CND)	
⚠13	1-575-651-91	CORD, POWER (AEP)	
58	1-777-276-11	WIRE (FLAT TYPE) (29 CORE)	
206	1-660-966-11	PC BOARD, OP RALAY FLEXIBLE	
208	1-777-517-11	WIRE (FLAT TYPE) (15 CORE)	
⚠267	8-583-028-02	OPTICAL PIC-UP KMS-260A/J1NP	
HP901	1-500-396-11	HEAD, OVER WRITE	
M901	A-4672-135-A	MOTOR ASSY, SPINDLE	
M902	A-4672-133-A	MOTOR ASSY, SLED	
M903	A-4672-134-A	MOTOR ASSY, LOADING	
⚠TR301	1-429-735-11	TRANSFORMER, POWER (US,CND)	
⚠TR301	1-431-426-21	TRANSFORMER, POWER (AEP)	
**********			
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-574-264-11	CORD, LIGHT PLUG	
	1-776-263-51	CORD, CONNECTION	
	3-864-669-11	MANUAL, INSTRUCTION (ENGLISH/FRENCH)	
	3-864-669-21	MANUAL, INSTRUCTION (AEP) (CHINESE/DUTCH/ITALIAN)	
	3-864-669-31	MANUAL, INSTRUCTION (AEP) (SPANISH/PORTUGUESE/SWEDISH)	
**********			
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#2	7-685-871-01	SCREW +BVTT 3X6 (S)	
#3	7-685-850-04	SCREW +BVTT 2X3 (S)	
#4	7-685-851-04	SCREW +BVTT 2X4 (S)	
#5	7-627-852-28	+P 1.7X3	
#6	7-627-553-17	PRECISION SCREW +P 2X2 TYPE 3	
#7	7-627-552-27	SCREW,PRECISION +P 1.7X2	
#8	7-685-872-09	SCREW +BVTT 3X8 (S)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.